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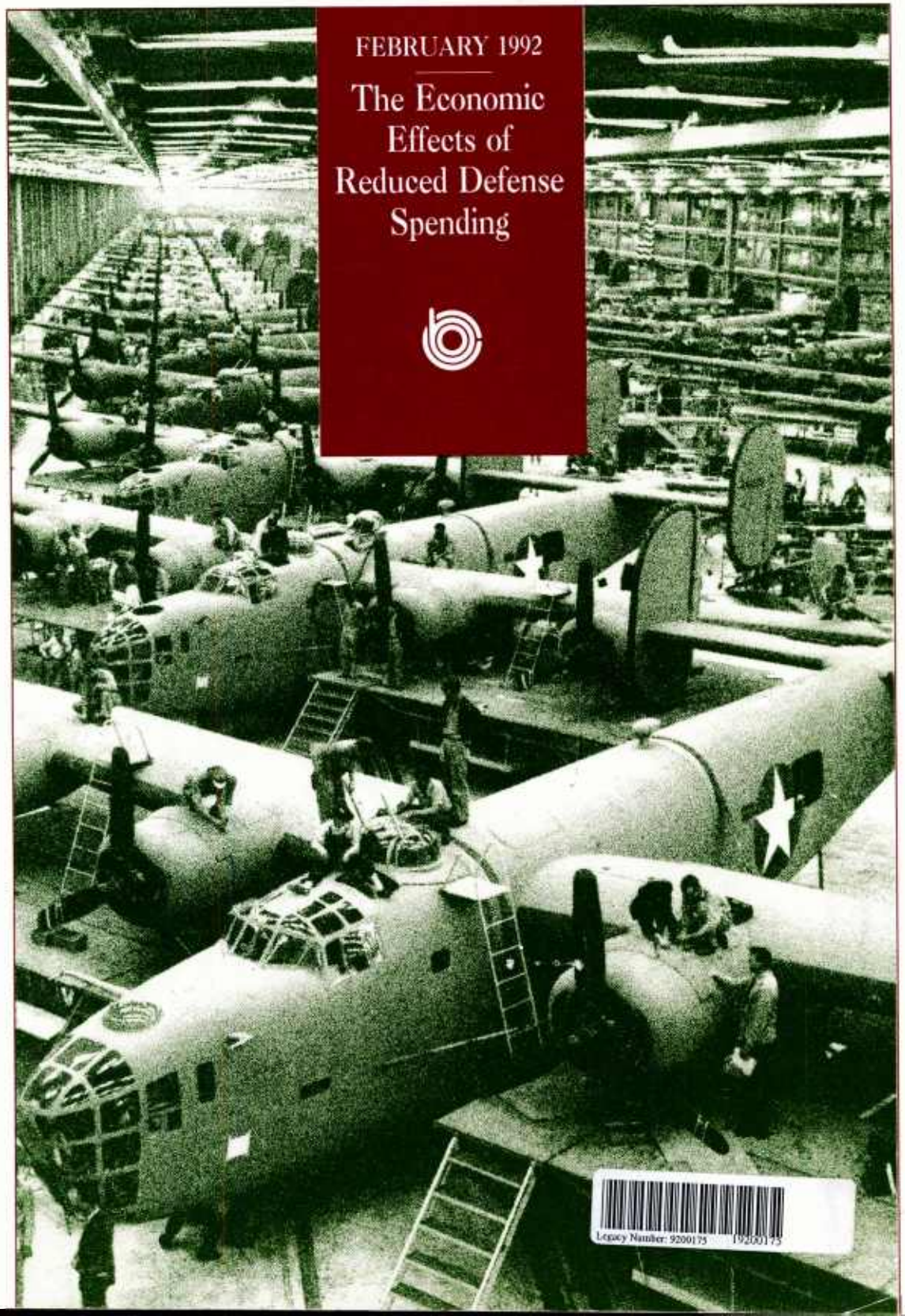
The Economic Effects of Reduced Defense Spending



THE ECONOMIC EFFECTS OF REDUCED DEFENSE SPENDING

The Congress of the United States
Congressional Budget Office

NOTES

All years referred to when discussing budget amounts are fiscal years; all years referred to when discussing economic results are calendar years.

Numbers in the tables and text may not add to totals because of rounding.

Unless otherwise indicated, dollar amounts are expressed in 1992 dollars.

The Balanced Budget and Emergency Deficit Control Act of 1985 (commonly known as Gramm-Rudman-Hollings) is referred to in this study more briefly as the Balanced Budget Act. The Act was amended by the Balanced Budget and Emergency Deficit Control Reaffirmation Act of 1987 and the Budget Enforcement Act of 1990.

Cover photo shows B-24s in production in Fort Worth, Texas, during World War II. Photo is courtesy of General Dynamics Corporation.

Preface

The past three years have seen, in both Europe and Asia, dramatic changes with profound implications for the United States and the world. As a result of the collapse of communism and the political and economic disintegration of the Soviet Union, the composition and size of U.S. military forces will undergo great changes. Initial reductions are already under way, and major cuts are being planned. By 1997, under the Administration's plan presented in February 1991, national defense outlays would be 28 percent below their peak level in the 1980s.

Changes of these magnitudes naturally raise concerns about economic effects. This Congressional Budget Office (CBO) study, prepared at the request of the Minority Leader of the United States Senate, examines the effects of cuts in defense spending not only on the national economy but also on states, industries, and selected local areas.

R. William Thomas of CBO's National Security Division wrote the Introduction and Summary and Chapter 3, which deals with effects on states and industries. G. Wayne Glass performed the analysis of effects on local communities that is presented in Chapter 4. Michael O'Hanlon analyzed the nuclear weapons industry. Karen Ann Watkins assisted in verifying their results. The analysts' efforts were supervised by Robert F. Hale. Barbara Hollinshead of CBO's Budget Analysis Division, under the supervision of Michael Miller, prepared CBO's estimates of defense spending according to the Administration's plan and alternatives.

Christopher Williams of CBO's Fiscal Analysis Division performed the analysis of macroeconomic effects presented in Chapter 2, with contributions by Matt Salomon, Stephan Thurman, Frank Russek, Joyce Manchester, Mark McMullen, and Patricia Wahl. Frederick Ribe and Robert Dennis supervised their efforts and contributed to the study.

The state and industry results presented in the study are based on simulations performed for CBO by the University of Maryland's INFORUM group. CBO would like to acknowledge the valuable contributions of Ralph Doggett, Margaret McCarthy, and Douglas Meade at INFORUM.

The authors gratefully acknowledge the assistance of Ralph Smith of CBO; Joseph Cartwright of the Office of Economic Adjustment, Office of the Secretary of Defense; and Murray Weidenbaum of the Center for the Study of American Business at Washington University in St. Louis. All three of those reviewers made valuable contributions to the final product. (The assistance of outside reviewers implies no responsibility for the final result, which rests solely with CBO.)

Roger M. Williams edited the study. Chris Spoor provided editorial assistance. Judith Cromwell and Verlinda Lewis typed the many drafts. Kathryn Quattrone and Martina Wojak prepared the study for publication.

Robert D. Reischauer
Director

February 1992

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Summary

More than any recent concept, the peace dividend has seized the attention of the general public--and of budget policymakers. Thanks to the collapse of international communism and the end of the four-decade-long Cold War, a large portion of federal spending once earmarked for maintaining national security can now be applied to other pressing national needs.

That undeniably good news casts a shadow, however. The substantial defense spending reductions being proposed will result in additional unemployment, business failures, and temporarily depressed communities in the areas around shuttered military bases.

Defense spending has often been subject to rapid increases and decreases. After every major war, military strength has been cut precipitously, with no big adverse effect on the economy. Indeed, the current pace of reduction is more limited than most past drawdowns. The Administration's 1992-1997 Future Years Defense Program, submitted in February 1991 (hereafter "the 1991 plan"), envisions a real reduction in defense outlays of 20 percent between 1991 and 1997. By 1997, outlays would be reduced to a level of about 3.6 percent of gross national product (GNP) compared with 5.5 percent in 1990 and 6.4 percent in 1987.

Especially in the aftermath of the political disintegration of the Soviet Union, the Congress will no doubt consider reductions in defense spending larger than those the Administration proposed last year. The appropriate amount by which such spending can be reduced must be judged primarily on the ability of the remaining military forces to meet potential threats to the security of the United States and its allies. But the effects of defense spending cutbacks on the economy are inevitably of serious concern to legislators.

Key Conclusions

Over the long term, the so-called peace dividend--if used to reduce the federal deficit--would increase national savings and investment and would therefore benefit the economy. By the next decade, the dividend realized under the 1991 plan could result in a permanent increase in GNP of around $50 billion a year (in 1992 dollars).

Over the next few years, however, applying the dividend to deficit reduction could adversely affect the economy, lowering GNP and employment, unless an expansionary monetary policy offsets defense spending cutbacks. The short-run changes will be modest in the national economy--within the normal range of variation in GNP--and in state economies, but could be serious for some industries and local communities.

The effects of the defense cuts the Administration proposed in February 1991 are already reflected in the latest short-run economic

forecast of the Congressional Budget Office (CBO). The forecast envisions a sluggish recovery beginning in the spring of 1992. Larger defense spending cuts, if used to reduce the deficit, could darken this short-run outlook even as they improved long-term economic performance. If instead the cuts resulted in more spending on consumption, most of the ill effects would be avoided in the short run; but the long-run economic benefits would then be lost.

Effects on the Overall Economy

The developments in Europe and the former Soviet Union will permit reducing defense spending without increasing the risk to U.S. national security. As noted, however, the peace dividend brings with it the need to make fundamental and difficult choices. Resources previously spent on defense can now be reallocated. If they are spent to improve the nation's stock of productive physical or human capital, these resources can ultimately be expected to lead to an increase in the GNP. If they are consumed, they will not.

If the goal is an increase in long-term GNP, savings from reducing defense spending could be used to fund carefully chosen federal investments. Research has shown that spending on such public facilities as roads and ports, and on education and training, can enhance productivity in the private sector. Alternatively, long-term GNP could be increased by using the funds to reduce the federal deficit. That would in turn increase national saving, resulting in lower interest rates, higher levels of domestic investment, and less foreign indebtedness. The Congress could also choose to return the savings to the taxpayer in the form of either a general tax rate reduction or a program of tax incentives meant to stimulate investment or research and development activities.

All three of these choices yield long-term returns--a higher level of consumption and, in the first two cases, higher productivity for the U.S. economy, fueled by increased domestic investment. Simulations suggest that the 1991 plan, if applied to deficit reduction, would result in a permanent increase in GNP of about six-tenths of one percentage point, or about $50 billion a year (in 1992 dollars), starting in the next decade.

Short-Run Effects

Cutting defense spending and using the funds to reduce the deficit, however, would tend to depress short-run economic activity because the capital and workers released from defense production might not immediately be put to work meeting other needs. Taking the 1991 plan, which proposes cutting defense spending through 1997, and assuming no offsetting changes in monetary policy, simulations suggest that real GNP would be temporarily reduced by as much as 0.7 percent in the mid-1990s compared with a situation in which defense spending were held unchanged in real terms. Those effects are already reflected in CBO's latest short-run forecast. The most optimistic of the models suggests that the effects on GNP would become positive by the late 1990s, a year or so after the Administration's planned cuts are assumed to end.

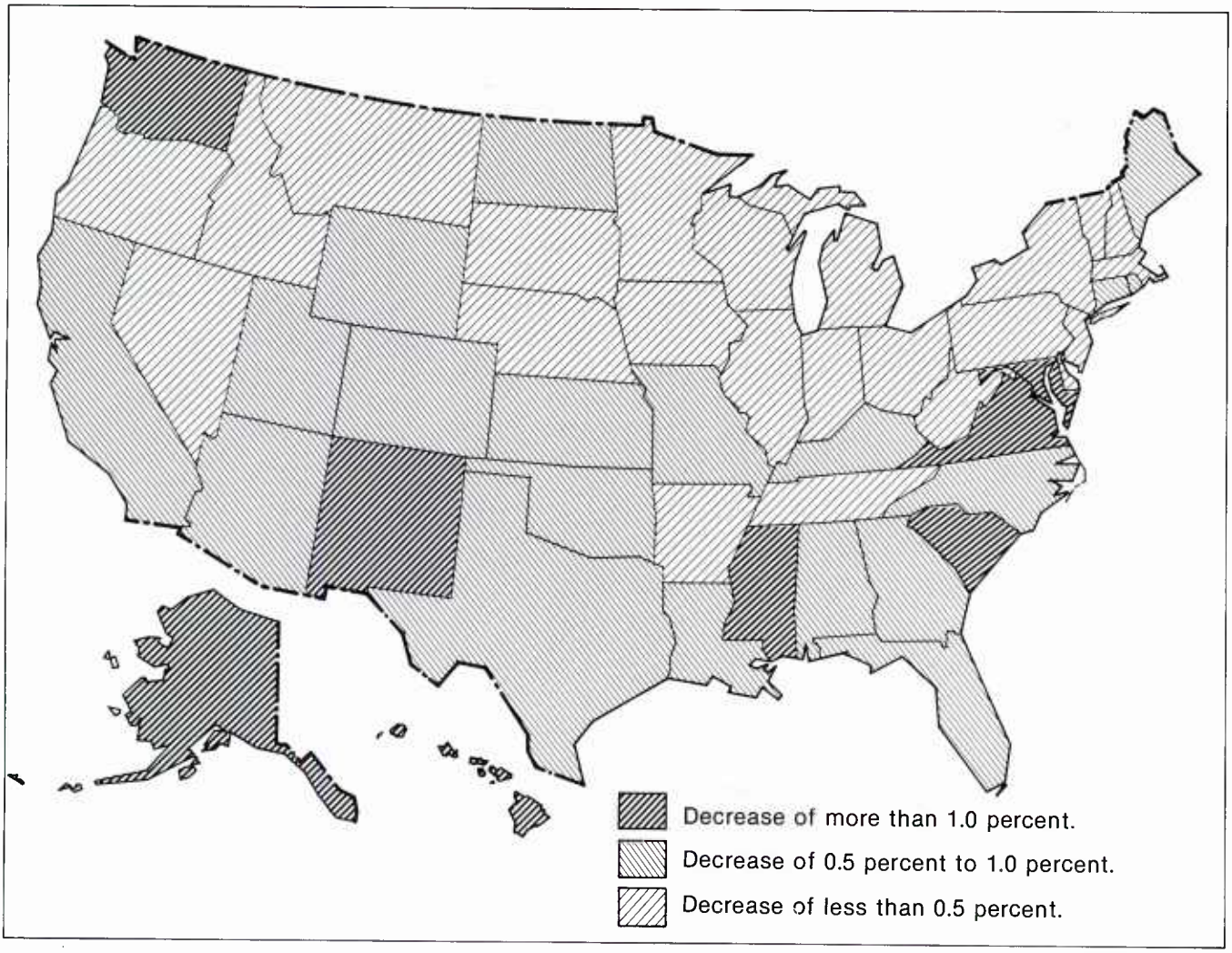
The short-run reductions in GNP associated with the 1991 plan would result in a temporary decline in employment--a decline that might reach 300,000 jobs in 1993. The number of defense-sector jobs eliminated would be even larger: more than 800,000 by 1995. Against those job losses, there would be job gains in other industries, chief among them homebuilding and machinery production, both stimulated by the increase in investment spending associated with lower federal deficits.

If defense spending cuts were larger than those the Administration proposed, and if

they were all used to reduce the federal deficit, the pattern of short-term reductions in GNP and of long-term gains would remain the same. But the magnitude of the changes would be larger. If, for example, the defense cuts were roughly half again as large as the 1991 proposals, the real reduction in GNP in the mid-1990s, and the long-term gains in GNP, might each exceed a full percentage point. At its peak, the decline in employment could reach one-half million jobs by 1996.

The adverse short-term effects of defense cuts can be eased by falling interest rates, especially if they are part of a credible long-term program to reduce the budget deficit. If lenders in financial markets foresee the cuts, they may act to reduce interest rates quickly. That will help stimulate spending in sectors of the economy that are sensitive to these rates in ways that mitigate the severity of the overall economic impacts. Many policymakers and analysts believe that the long-term strategy for deficit reduction embodied in the

Summary Figure 1.
Decrease in State Output by 1995 Under Defense Cuts Planned in 1991



SOURCE: Congressional Budget Office using the INFORUM model.

NOTE: U.S. average is a 0.6 percent decline.

Budget Enforcement Act of 1990 has helped limit the negative impacts of defense cuts up to now.

The pattern of near-term losses and long-term gains in GNP would be quite different if the proceeds from lower defense budgets went to increase spending on consumption. Suppose, for example, that cutbacks paid for increases in federal entitlement programs or tax reductions that promote private consumption more than investment. In this case, economic analysis suggests that there would be little adverse effect on GNP or jobs in the short term because the depressing effects of reductions in defense spending would be offset by the stimulative effects of higher consumption. But the economy would also miss out on the long-term benefits associated with using the peace dividend to enhance saving and investment.

Effects on the States

How would spending cutbacks affect different regions? Individual states vary considerably in their dependence on the defense dollar. Regions near the coasts rely on defense spending more than do states in the Midwest and Great Plains regions. California leads the list with more than 19 percent of the national defense budget being spent in that state. The next largest amounts of spending accrue to Texas and Virginia; Florida, New York, Washington, Pennsylvania, Massachusetts, Maryland, and Georgia complete the top 10 states. Given the size of their economies, some smaller states join the list of those that depend heavily on defense. Alaska and Hawaii, both of which have several large military bases, would rank in the top 10 based on defense shares of their economies; so would Mississippi.

Even for the states that depend most heavily on defense, the short-run adverse effects associated with the 1991 plan would be relatively modest. Relative to the base case results, eight states and the District of Columbia might experience a reduction exceeding 1 percent; the largest impact would be in Hawaii, with a 2.6 percent reduction. Thus 42 of the 50 states would experience a reduction in output of less than 1 percent (see Summary Figure 1 on previous page). Moreover, effects on state output should be temporary. The most affected states should be able to absorb changes of this magnitude without an absolute decline in employment or production.

Larger cuts in defense spending would produce proportionally larger effects on the states. For example, a cut roughly half again as large as the one the Administration proposed in February 1991 would produce a temporary reduction in output of 1 percent or more in 10 states.

Effects on Industries

For most U.S. industries, the effects of the 1991 plan would be negligible. Of some 420 industries examined by CBO, 86 percent would experience a loss of sales of less than 1 percent in 1995, relative to the base case. This small impact would be difficult to distinguish from normal year-to-year fluctuations.

For a handful of industries, however, the effects would be important. Those few that sell mainly to the Department of Defense (DoD)--builders of combat vehicles, shipbuilders, and ordnance manufacturers--would find their sales declining from 6 percent to 17 percent by 1995 (see Summary Table 1).

Larger reductions in defense spending are likely. If defense cuts are half again as large as the 1991 plan calls for, about 70 percent of all industries would still experience a loss of sales of less than 1 percent by 1995. For the handful of industries most affected, sales declines would range from 5 percent to more than 50 percent.

Summary Table 1.
Effects of Spending Reductions According to the 1991 Plan on Defense Industries (For calendar year 1995, by percent)

Industry	Defense Share of Production	Effect of Defense Cuts on Total Output
Tank and Tank Components	100	-17
Shipbuilding and Repair	99	-6
Complete Guided Missiles	84	-2
Other Ordnance and Accessories	51	-7
Explosives	44	-3
Aircraft, Missile Engines	43	-2
Communications Equipment	42	-3
Aircraft	40	-1
Nonferrous Forgings, n.e.c.	35	-2
Aircraft, Missile Equipment	27	-1
Small Arms Ammunition	26	-2
Ammunition, Except Small Arms	24	-2
Small Arms	19	-1
Engineering and Scientific Instruments	18	-1

SOURCE: Congressional Budget Office.

NOTE: n.e.c. = not elsewhere classified.

Defense cutbacks would adversely affect some industries, notably aircraft manufacturers. Still, they may grow despite the reduction in their defense business because their nondefense markets are likely to expand rapidly. But other approaches to offsetting cutbacks in DoD orders are less likely to succeed. Some defense producers are trying to increase their sales to foreign governments in an effort to replace DoD orders. For most, however, prospects in that area are limited: because of their technological sophistication, U.S. weapons are expensive to buy and maintain. Furthermore, decreases in the defense budgets of European countries will mean that their own arms manufacturers will be increasing their efforts to compete for arms sales abroad. History also suggests a limited ability on the part of specialized defense firms successfully to convert their plants to manufacture commercial products. Many defense workers may therefore have to seek new employment.

Effects on Local Communities

As with industries, a few local communities would suffer serious adverse effects in the short run. Most, however, would probably find ways to offset the cutbacks' effects in the longer term.

To illustrate the potential for adverse effects, CBO examined three communities that depend heavily on defense spending: Monterey, California (home of the Army's Fort Ord, one of the bases that has been approved for closing); the south coastal section of Maine (the site of Bath Iron Works, a leading builder of cruisers and destroyers); and St. Louis, Missouri (where the McDonnell Douglas Corporation, a leading defense contractor, maintains major production facilities). CBO chose these three areas to reflect the diverse

ways in which defense spending cutbacks affect those local communities that depend heavily on defense dollars. Their inclusion is not tied to a specific assumption about future spending cuts, nor does it imply that CBO recommends cutbacks in any of them.

Dependence and Its Effects

Wages and salaries for Fort Ord personnel constitute 31 percent of total wages and salaries for Monterey County. Bath Iron Works employs some 11,000 workers, about 5 percent of the labor force along Maine's south coast. Wages and salaries of defense workers in and around St. Louis--including military and DoD civilian personnel as well as defense-plant employees--represent 6 percent of the area's total.

Cutbacks in these three areas could have serious short-run effects. When Fort Ord closes, unemployment in the Monterey area could grow by as much as 8 percentage points. That would reflect the loss of jobs at the post and of other jobs that depend on spending by the military community. Similarly, in parts of Maine unemployment could rise by as much as 7 percentage points if Bath Iron Works shuts down. Were McDonnell Douglas to experience a one-third cutback in employment, unemployment in the St. Louis area might increase by as much as 2 percentage points. Loss of tax revenues and slumping real estate values also enter the picture. Closing Fort Ord could lead to declines in adjacent commercial and residential property values; those losses might seriously erode the tax base of Monterey County.

Bear in mind, however, that those are worst-case estimates. They assume that all workers lose their jobs simultaneously and cannot secure new ones. In fact, base closings and cutbacks tend to be phased over a period of years, giving workers time to find other jobs and limiting the rise in unemployment.

Other adverse effects would also be involved. Consider, for example, the 18,500 retired military personnel and their dependents who live near Fort Ord. If the base hospital closed, they would lose access to the county's largest full-service medical facility.

Those adjustment problems could be prolonged, perhaps substantially, by the process of cleaning up the environment at bases that are closed. That is especially true of Fort Ord, which the Environmental Protection Agency has designated as a Superfund site requiring an extensive cleanup effort. Similar efforts elsewhere have taken an average of 10 years.

Long-Term Outlook

In some cases, communities will find it difficult to recover from defense cutbacks. Among the three areas CBO examined, south coastal Maine might have the most trouble. There is slight prospect for replacing lost Navy sales with commercial shipbuilding work. And there is no alternative local employment that uses comparable skills and offers comparable pay. Such employment may not be available in the entire region; New England's share of manufacturing employment has decreased steadily since 1984.

Most areas, however, should find recovery less difficult. For example, a diverse economy like that of St. Louis, or a popular retirement area like Monterey, probably will eventually provide employment for the people and resources no longer needed for defense purposes. The St. Louis economy has continued to generate new nonmanufacturing jobs in the business services, health services, and computer fields to replace manufacturing jobs lost in the 1980s. And Fort Ord's site has a great potential for alternative uses, many of which are already under discussion.

Chapter One

Introduction

The prospect of a substantial peace dividend has played a major role in recent debates over the federal budget--especially the 1990 budget summit negotiations and the subsequent debate on the Omnibus Budget Reduction Act of 1990 (OBRA-90). Of the $500 billion reduction in the federal deficit over the 1991-1995 period, $180 billion, or 36 percent, was taken from defense. The 1990 discussions took place after the announcement of plans to remove Soviet forces from Eastern Europe, the collapse of the Warsaw Pact, and the unification of Germany under a democratic government.

Those events signaled the elimination of a perceived threat to the security of Western Europe, a threat that had shaped the structure of U.S. forces during the Cold War. As a result, the Secretary of Defense and the Chairman of the Joint Chiefs of Staff presented a plan in February 1991 (hereafter "the 1991 plan") for a 25 percent reduction in military forces, with the resulting savings applied to the targets set by the budget summit. This Congressional Budget Office (CBO) study analyzes the defense budget reductions specified in that 1991 plan.

At the time those budget and forces decisions were made, the Soviet Union was still intact; it remained the world's largest and arguably strongest single military power. In the wake of the collapse of communism and the disintegration of the Soviet Union, debate over the U.S. defense posture has resumed. Many participants call for deeper defense budget reductions. At the time this study went to press, reports were circulating that the Administration might propose deeper cuts in its fiscal year 1993 budget request.

One concern often raised during the debates is the effect rapid reductions in defense spending might have on the domestic economy. Cutbacks associated with closing military bases and terminating weapons orders threaten jobs and income. At a minimum, hundreds of thousands of workers will need to find new employment and perhaps be trained to do different tasks. Many firms will have to secure other markets for their products or suffer significant losses in revenues and profits. Furthermore, the economic dislocation associ-

Of the $500 billion reduction in the federal deficit over the 1991-1995 period, $180 billion, or 36 percent, was taken from defense.

ated with the transition to a civilian-oriented economy will occur at a time when the United States is already struggling to recover from other economic problems brought on by the excesses of the 1980s.

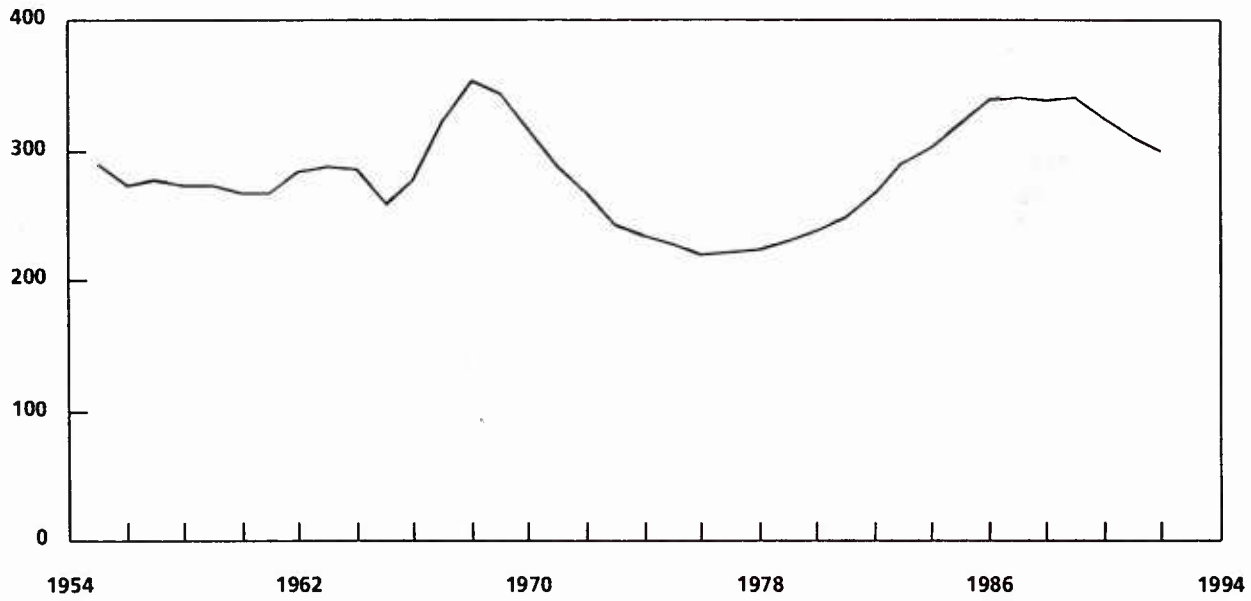
Ups and downs in defense spending are hardly a new economic phenomenon. In the 1960s, increases were driven by the escalation of the Vietnam War, while the 1970-1975 period was characterized by the winding down of that conflict. By the late 1970s, a consensus was developing that perhaps cuts had been taken too far, given the major improvements then occurring within the Soviet military machine. By 1980, the adequacy of U.S. defenses had become a major issue of the Presidential campaign.

During the first term of the Reagan Administration, defense expenditures grew at an unparalleled peacetime rate. National defense budget authority increased from $246 billion in fiscal year 1980 to $368 billion in fiscal year 1985. (Unless otherwise indicated, all budget amounts in this study are expressed in constant 1992 dollars.) After adjustment for inflation, that amount marked a real increase of 49 percent. The military services, with the exception of the Navy, did not use these funds to increase their numbers of active forces significantly. Instead, they mainly chose to increase spending on modernizing weapons systems and selected reserve forces, to increase funding for operations and support, and to improve military pay and benefits.

Since fiscal year 1985, however, budget authority for national defense has been cut significantly. For fiscal year 1991, it is 20 percent below the 1985 peak after adjustment for inflation. Real outlays for national defense display a similar pattern, although the peak for outlays did not occur until 1987, and the real decline by 1991 was a modest 9 percent below the peak value (see Figure 1).

The collapse of the Warsaw Pact and the withdrawal of Soviet forces from Eastern Europe created the expectation that the U.S.

Figure 1.
National Defense Outlays (By fiscal years, in billions of 1992 dollars)



SOURCE: Congressional Budget Office.

defense budget could be cut by far greater amounts. Before the war with Iraq, President Bush endorsed the concept of a 25 percent reduction in U.S. forces. The 1992-1997 Future Years Defense Program, which was submitted in February 1991, envisioned that by 1995 the real defense budget would be about 18 percent below its 1990 level (see Table 1).

The 1991 plan called for major reductions in military forces and personnel by 1997: in Air Force active and reserve tactical air wings, from 36 to 26.5; in Army active and reserve divisions, from 28 to 18; and in Navy fleet size, from 545 to 448 ships (see Table 2). By 1997, the Department of Defense (DoD) expects to reduce the number of active-duty military personnel to 1.63 million--380,000 below the 1991 level. The number of selected reserve personnel--reservists in operational units--will be reduced by 220,000, and the ranks of DoD civilian personnel will be thinned by 140,000.

As the armed forces are cut back, the facilities that support the military will be reduced accordingly. That process is already under way; the Congress approved closing or realigning 145 military installations in 1989 and 82 more in 1991. Further cutbacks are likely: the 1991 National Defense Authorization Act calls for the Base Closure and Realignment Commission to reconvene in 1993 and again in 1995 to reassess military needs and recommend additional facilities for shutdown.

Concerns--some of them intense--have been raised about the effect of such reductions on the U.S. economy and the defense industrial base. Major corporations and officials of states and localities with a heavy defense presence are worried.

Many communities adjacent to military bases could be seriously affected, at least in the short-term, by their closure. New military construction is nearly at a standstill while

Table 1.
National Defense Budget Authority in the 1991 Plan (By fiscal year, in billions of 1992 dollars)

	1993	1994	1995	Percentage Change 1990-1995
Operating Appropriations				
Military personnel	74.2	70.3	67.0	-21
Operation and maintenance	81.4	78.3	76.5	-19
Other	4.8	4.7	3.7	15
Subtotal	160.4	153.3	147.2	-19
Investment Appropriations				
Procurement	64.5	64.2	67.5	-23
RDT&E	39.6	37.4	33.7	-15
Military construction	3.6	6.5	5.7	3
Atomic energy defense activities[a]	11.8	12.0	12.1	15
Subtotal	119.5	120.1	119.0	-17
Total	279.8	273.4	266.3	-18

SOURCE: Congressional Budget Office based on Department of Defense data.

NOTE: RDT&E = research, development, test, and evaluation.

a. Environmental restoration activities are included in "Other" category.

closures are being weighed. Procurement spending in real terms has already been cut to half the 1985 level. Many acquisition programs for weapons systems have been canceled, while development activities for others have been deferred. Such effects will be intensified if defense cuts larger than those specified in the 1991 plan are made.

What impact will these actions have on personal income and national economic activity? How will they affect the sales of domestic industries? Which states' economies will suffer the greatest negative impact? Will the reductions add significantly to the rate of unemployment or precipitate a recession? And to what extent will localities that depend heavily on the defense dollar experience hardships?

Table 2.
Military Forces Under the 1991 Plan

	Forces		
	1990	1997 (Base)[a]	Percentage Reduction
Active Forces			
Ground Forces			
Army divisions	18	12	33
Marine brigades	9	7[b]	22
Naval Forces			
Aircraft carriers	13	12	8
Carrier air wings	13	11	15
Ships[c]	545	448	18
Air Forces			
Tactical fighter wings	24	15.5	35
Strategic Forces			
Land-based ICBMs	1,000	550	45
Sea-launched ballistic missiles	608	432	29
Strategic bombers (PAA)	228	181	21
Reserve Forces			
National Guard Divisions	10	6	40
Marine Brigades	3	3	0
Carrier Air Wings	2	2	0
Tactical Fighter Wings	12	11	8

SOURCE: Statement of General Colin Powell before the Subcommittee on Defense, House Committee on Appropriations, September 25, 1991, except as noted.

NOTES: "The 1991 plan" refers to the planned reductions announced by the Administration in February 1991.

ICBMs = intercontinental ballistic missiles.

PAA = primary authorized aircraft.

a. Forces planned for 1997 by the Administration.

b. Estimated by Congressional Budget Office based on reduction in Marine Corps personnel.

c. Includes ships assigned to reserve forces.

Chapter Two

Effects of Reducing Defense Expenditures on the Level of Economic Activity

The link between defense spending and economic prosperity has long been a subject of dispute. One view, a product of the experiences of the Depression and World War II, is that high levels of defense spending are crucial to maintaining prosperity because they offset tendencies in the capitalist system toward under-consumption and stagnation.[1] Another contends that advances in civilian technology have often stemmed from research conducted primarily for defense purposes.[2] In contrast, a third view blames the defense burden for the poor economic performance of the United States in recent years.[3] Mainstream economists, however, have tended to regard defense spending as neither a drag on nor a stimulus to economic activity in the long run.[4]

This chapter assesses the effects of reduced defense spending on overall economic activity. The Congressional Budget Office concludes that, if cutbacks in defense spending are used to reduce the federal deficit and are not met with offsetting changes in monetary policy, they will lead to temporary reductions in gross national product (GNP) and employment. The temporary adverse effects of the defense cuts in the 1991 plan would persist until the late 1990s. In the long run, however, deficit reductions should lead to lower interest rates and permanently higher levels of GNP than would occur without spending cutbacks.

How Changes in Defense Spending Affect the Economy

A large reduction in defense spending will free resources for other purposes; indeed, that is what is meant by the phrase peace dividend. Reductions will have different effects on the economy in the first few years after the cuts occur than in the longer run.

Long-Term Effects of the Peace Dividend

In the long term, the effects of the peace dividend on economic activity will depend on whether the dividend is used to increase consumption or the economy's productive capac-

1. Paul A. Baran and Paul M. Sweezy, *Monopoly Capital* (New York: Monthly Review Press, 1966), pp.177-218. Baran and Sweezy's premise--that the capitalist system suffers typically from under-consumption and stagnation--has been spectacularly contradicted by the experience of the past 40 years in the United States. During that period, consumption growth was consistently high, leading at first to very strong economic growth in the 1950s and 1960s and then later to poor national saving in the 1980s.

2. Congressional Budget Office, *How Federal Spending for Infrastructure and Other Public Investments Affects the Economy* (July 1991).

3. Paul Kennedy, *The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500 to 2000* (New York: Random House, 1987).

4. David Gold, *The Impact of Defense Spending on Investment, Productivity and Economic Growth* (Washington, DC: Defense Budget Project, 1990), p. 3; and David Gold and Gordon Adams, "Defence Spending and the American Economy," *Defence Economics*, vol. 1 (1990), pp. 275-293.

ity. The latter would eventually lead to higher levels of GNP, while the former would not.

Long-term increases in productive capacity could result from any of several uses of the peace dividend:

- *To reduce the federal budget deficit.* This increases economic productivity by increasing household, business, and other types of saving; the saving is then available for investment in machinery, factories, training, and other productive assets in the private sector. Expanded productive capital is one of the best understood sources of economic growth.[5] Although some analysts argue that reducing the federal deficit is not likely to increase national saving--because private saving would fall at the same time--the consensus view holds that reducing deficits by cutting spending for defense and other programs should significantly expand saving and capital formation, while reducing borrowing from abroad.[6]

- *To apply at least part of it to fund carefully chosen federal investments.* The effects of this choice are closely related to those of the first option. Federal spending on certain assets (roads, ports, airports, pollution-control facilities, schools, training, social services, and research and development) can eventually lead to increased productivity in the private sector, provided that investments are selected according to their ability to do that.[7]

- *To finance selected types of tax reductions.* According to supply-side theorists, the strongest effects on economic growth would come from applying the peace dividend to reduce marginal tax rates, which would strengthen incentives for work, saving, and entrepreneurship. These claims are controversial, however, in large part because most of the available statistical estimates suggest that reduced tax rates yield only small increases in productive activity.[8]

In the quantitative analyses presented in this study, CBO assumes that the peace dividend is applied to reduce the size of the fed-

5. For a detailed discussion of the factors influencing economic growth, see Edward F. Denison, *Trends in American Economic Growth, 1929-1982* (Washington, D.C.: Brookings Institution, 1988); and Dale W. Jorgenson, Frank M. Gallop, and Barbara G. Fraumeni, *Productivity and U.S. Economic Growth* (Amsterdam, Netherlands: North Holland, 1987). For an overview of recent work on economic growth, see two essays in the *Brookings Papers on Economic Activity: Microeconomics 1990* (Washington, D.C.: Brookings Institution, 1990). One is by Martin N. Baily and Charles L. Schultze, "The Productivity of Capital in a Period of Slower Growth," the other by Paul M. Romer, "Capital, Labor, and Productivity."

6. See Robert J. Barro, "Are Government Bonds Net Wealth?" *Journal of Political Economy*, vol. 82 (November 1974), pp. 1095-1117; B. Douglas Bernheim, "Ricardian Equivalence: An Evaluation of Theory and Evidence," in Stanley Fischer, ed., *Macroeconomics Annual 1987* (Cambridge, Mass.: MIT Press), pp. 263-315; and Leonardo Leiderman and Mario Blejer, "Modeling and Testing Ricardian Equivalence: A Survey," *IMF Staff Papers*, vol. 35, no. 1 (March 1988), pp. 1-35.

7. See, for example, David A. Aschauer, "Is Public Capital Productive?" *Journal of Monetary Economics*, vol. 23 (1989). CBO's views are set out in *How Federal Spending for Infrastructure and Other Public Investments Affects the Economy.*

8. See Don Fullerton, "On the Possibility of an Inverse Relationship between Tax Rates and Government Revenues," *Journal of Public Economics*, vol. 19 (1982), pp. 3-22; Jerry A. Hausman and James M. Poterba, "Household Behavior and the Tax Reform Act of 1986," *Journal of Economic Perspectives*, vol. 1, no. 1 (Summer 1987), pp. 101-119; Robert K. Triest, "The Effect of Income Taxation on Labor Supply in the United States," *Journal of Human Resources*, vol. 25, no. 3 (Summer 1990), pp. 491-516; Jerry Hausman, "Taxes and Labor Supply," in Alan J. Auerbach and Martin Feldstein, eds., *Handbook of Public Economics* (Amsterdam, Netherlands: North Holland, 1985), pp. 231-263; Mark R. Killingsworth and James J. Heckman, "Female Labor Supply: A Survey," in Orley Ashenfelter and Richard Layard, eds., *Handbook of Labor Economics*, (Amsterdam, Netherlands: North Holland, 1986), pp. 103-204; John Pencavel, "Labor Supply of Men: a Survey," in Ashenfelter and Layard, eds., *Handbook of Labor Economics*, pp. 3-102; and Gary Burtless, "Work Response to a Guaranteed Income: A Survey of Experimental Evidence," in Alicia H. Munnell, *Lessons from the Income Maintenance Experiments*, proceedings of a conference sponsored by the Federal Reserve Bank of Boston and the Brookings Institution (Boston: Federal Reserve Bank of Boston, Conference Series No. 30, 1986) pp. 22-52.

eral deficit, and that this use--like other such measures--will expand overall activity in the long term. Indeed, the 1991 plan for cuts in defense spending--the first to be examined--is a central part of the deficit-reduction policies established in the Omnibus Budget Reconciliation Act of 1990, particularly in the provisions of that act known as the Budget Enforcement Act (BEA).

The BEA has thus far prevented the peace dividend from being used to expand other discretionary federal spending or to cut taxes.

The act establishes limits on discretionary federal spending for defense and other discretionary programs, and it mandates that any tax cuts be balanced through increases in other taxes or reductions in entitlement spending programs (see Box 1). For fiscal years 1991 and 1992, the BEA appears to have been successful in holding discretionary spending and legislative changes in taxes and entitlements to preestablished limits that clearly reduce the deficit below the levels that it would otherwise have reached. The BEA has thus far prevented the peace dividend from being used to expand other discretionary federal spending or to cut taxes.

At least part of any peace dividend, however, may be used for consumption. It could, for example, fund increased spending for nondefense programs that do not improve productivity or, alternatively, tax cuts that lead primarily to increases in consumption. Although the latter use may be judged appropriate, particularly in view of the current weakness in the economy, it would not increase productivity and GNP in the long run.

Short-Run Impacts of the Peace Dividend

As with long-term effects, the short-run impact of the peace dividend also depends on how it is used: if to reduce the federal deficit, then cuts in defense spending--indeed, cuts in any type of spending--would reduce the demand for goods and services. Lower defense spending would have that effect because some members of the armed forces, workers in defense industries, and others would lose their jobs, and still others would lose parts of their income. Those income changes would in turn cause further cuts in spending by the workers affected, spreading the income losses even farther.

The short-run downturn in economic activity caused by defense spending cuts will last until other categories of spending increase to take their place. Normally, that would come about largely through lower rates of interest, resulting from lower federal deficits and reduced demands for credit. Lower rates would make domestic investment more attractive and also reduce borrowing from abroad; that would in turn depreciate the dollar, making U.S. goods more attractive in world markets and improving the nation's balance of trade. Those are, of course, precisely the changes that are necessary to bring about the long-run improvement in U.S. growth described in preceding paragraphs.

Because of the Budget Enforcement Act of 1990, the mitigating effects of declining interest rates may be larger and more rapid than would otherwise be the case. The BEA establishes a more credible schedule of deficit reductions than has been agreed on in the past. As a result, the reduction in interest rates should materialize more quickly.

Deficit reduction will not, however, occur immediately. As the recent budget projec-

Box 1.
The Budget Enforcement Act of 1990

The Budget Enforcement Act (BEA) of 1990 substantially improves control of the budget by impeding passage of legislation that would increase the deficit. It does so without relying on fixed deficit limits, which were the hallmark of the Balanced Budget Act of 1985 (commonly known as Gramm-Rudman-Hollings). Instead, the new act controls the deficit primarily by controlling the level of discretionary spending and the way tax reductions and additions to nondiscretionary spending are financed. Deficit targets are included in the new budget act, but they are adjustable. The new act thus does not guarantee a decline in the deficit over time. Rather, it focuses on preventing new legislation from increasing the deficit.

The BEA contains three types of controls. It places dollar caps on spending classified as discretionary; it prohibits debt financing of reductions in taxes and increases in mandatory spending; and it extends deficit targets through 1995, though they are superseded by more detailed targets at least through 1993.

Controlling Discretionary Spending. For the years 1991, 1992, and 1993, the Budget Enforcement Act divides discretionary spending (that is, spending that requires an annual appropriation) into three parts: defense, international, and domestic. Through 1993, separate limits apply to the amount of budget authority and budget outlays that can be devoted to each of these three broad categories of discretionary spending. For 1994 and 1995, however, the caps on authority and outlays apply to discretionary spending as a whole.

During 1991-1993, spending in any of these three categories that exceeds the applicable caps will trigger an automatic, across-the-board reduction, or sequestration, of spending in that category. After 1993, when the cap on discretionary spending as a whole is exceeded, it will trigger a sequestration applied to discretionary spending as a whole.

The caps on discretionary spending are adjusted twice a year--at the beginning and at the end of a Congressional session--to allow for a number of specified factors, including designated emergencies and differences between actual and expected inflation. In this regard, the law specified that the incremental costs of Operation Desert Storm were to be treated as an emergency; it was therefore not necessary to reduce other defense spending to satisfy the cap on the defense component of discretionary spending.

Because defense, international, and domestic discretionary spending are treated separately through 1993, actions that would reduce defense outlays below their cap would also reduce the deficit. The freed budgetary resources could not be used to increase spending in the other two discretionary categories. After 1993, however, reductions in defense spending would provide budgetary resources that policymakers could use to raise the domestic and international components of discretionary spending. Thus, under the new budget act, a peace dividend could not result in additional spending for nondefense purposes until 1994. But the increased tightness of the caps in 1994 and 1995 means that the competition for budgetary resources will increase in those years. The peace dividend could then help to lessen the conflict between those who advocate more defense spending and those who advocate more nondefense spending.

Financing Increases in Mandatory Spending and Reductions in Taxes. Under the Budget Enforcement Act, reductions in taxes and increases in mandatory spending are not permitted, taken together, to increase the deficit in any year. That is, reductions in taxes or increases in mandatory spending, which otherwise would increase the deficit, must be financed entirely by increases in other taxes or reductions in other mandatory spending. Thus, unlike the caps on discretionary spending, this pay-as-you-go requirement of the Budget Enforcement Act does not control spending. Instead, it prohibits debt financing of tax reductions and mandatory spending increases. Moreover, decreases in taxes or increases in mandatory spending cannot be financed by reductions in discretionary spending, including those that could result from a peace dividend.

Adjustable Deficit Targets. Although the BEA contains deficit targets that extend through 1995, these targets are adjustable (for such factors as revised economic and technical assumptions), and would automatically be met through 1993 if the discretionary spending caps and the pay-as-you-go provisions of the act are satisfied. After 1993, however, the President has the option not to adjust the deficit targets. If the targets are adjusted, the deficit targets still would be satisfied by adhering to the caps on discretionary spending and the pay-as-you-go requirement. If the targets are not adjusted, any excess deficit would trigger across-the-board cuts, applied equally to defense and nondefense spending.

The new fiscal discipline imposed by the BEA may prove more successful, for several reasons, than the former one based on fixed deficit targets. Because the discipline covers a budget horizon that extends five years instead of one, shifting spending or taxes from one year to another will no longer be a way to avoid true deficit reductions. Moreover, because sequestration will fall primarily on categories of spending that exceed their limits, the trade-offs will be more explicit. Finally, at least through 1993, the controlling factor is not the size of the deficit, which is sensitive to developments that policymakers cannot directly control, but the deficit effect of new legislation, which the Congress can control.

tions of both the Administration and CBO demonstrate, budget deficits can still rise if the economy weakens and if problems in federally insured financial institutions lead to massive federal spending to pay claims under deposit insurance.[9] If the Congress and the Administration continue to adhere to the terms of the BEA, however, legislative changes in the next few years will work to reduce the overall deficit.

As financial markets recognize the improved prospect of fiscal restraint inherent in the BEA, long-term real interest rates are likely to fall below what they would otherwise be, stimulating investment and net exports in the manner described earlier. Because the markets are looking forward to *future* policy restraint under the BEA, the increases in investment and net exports will occur earlier, and they will offset the cuts in spending more quickly. The BEA package reduces the risk that future policy changes will nullify the reduction in government borrowing made possible by defense cuts.

As a result, the short-run reductions in total demand and GNP are likely to be much smaller than they would otherwise have been. If that occurs, it will represent a significant change from the last decade, when interest rates reflected expectations of growing demands for credit by the federal government as a result of a lack of budget discipline.

Adverse short-term impacts can also be offset, or even eliminated, if the Federal Reserve's monetary policy is relaxed in order to stimulate the economy. By pushing interest rates down further, monetary policy can stimulate spending for investment and net exports. A sufficiently strong monetary response can eliminate the negative overall effect of the cuts in federal spending. Such monetary accommodation does not generally occur, however, and is not assumed in this study.

9. CBO, *The Economic and Budget Outlook: An Update* (August 1991); Executive Office of the President, *Mid-Session Review of the Budget* (July 15, 1991).

In sum, the short-run economic effects of spending the peace dividend on deficit reduction may well be adverse, but with a promise of better things to come. How would the outlook change if the dividend were applied to increasing consumption instead?

If the peace dividend is consumed, the economy will sacrifice longer-term gains.

The short-run impact would be significantly less adverse, with job losses in the defense sector substantially offset by the increased consumption. Thus short-run effects should be modest. That would be true whether the added consumption came in the form of increases in general nondefense spending or in general tax cuts. Note that increases in nondefense spending may offset the defense cuts more fully than would tax reductions because some of the reductions in taxes may be saved rather than being spent as consumption. If the peace dividend is consumed however, the economy will sacrifice the longer-term gains--including lower real interest rates, higher capital formation and, ultimately, higher living standards--that follow deficit reduction.

Defining Alternative Paths for Defense Spending

To assess the effects of defense spending cutbacks in quantitative terms, one must specify the size and nature of the reductions. This chapter examines the effects of two alternative scenarios that could occur between 1992 and 1997. The results are compared with a base

Table 3.
Alternative Defense Spending Paths (By fiscal year, in billions of dollars)

	1991	1992	1993	1994	1995	1996	1997
Base Case (Real defense budget authority unchanged)							
Budget Authority	288	302	314	328	342	357	372
Outlays	300	306	311	321	333	347	361
Alternative 1: Administration's 1991 Plan (3 percent annual decline)[a]							
Budget Authority	328	291	291	292	295	298	303
Outlays	322	313	296	292	289	289	288
Percentage Change in Outlays Relative to Base Case	8	2	-5	-9	-13	-17	-20
Alternative 2: Larger Reduction (6 percent annual decline)[a]							
Budget Authority	328	281	275	270	266	261	256
Outlays	322	302	281	273	267	262	258
Percentage Change in Outlays Relative to Base Case	8	-1	-10	-15	-20	-24	-29

SOURCE: Congressional Budget Office.

a. Includes emergency spending for Operation Desert Storm.

case that embodies constant real defense budget authority from 1992 to 1997 at the 1991 level set in the BEA.[10] Real outlays fall somewhat in the base case between 1991 and 1993, however, reflecting the delayed effects of cuts in real budget authority that have occurred between 1985 and 1991; outlays are stable from 1993 to 1997. (Some comparisons are extended into the next century. In the comparisons extended beyond 1997, the base case is taken to embody a constant share of defense spending in gross domestic product (GDP)--that is, defense spending grows with real GDP).

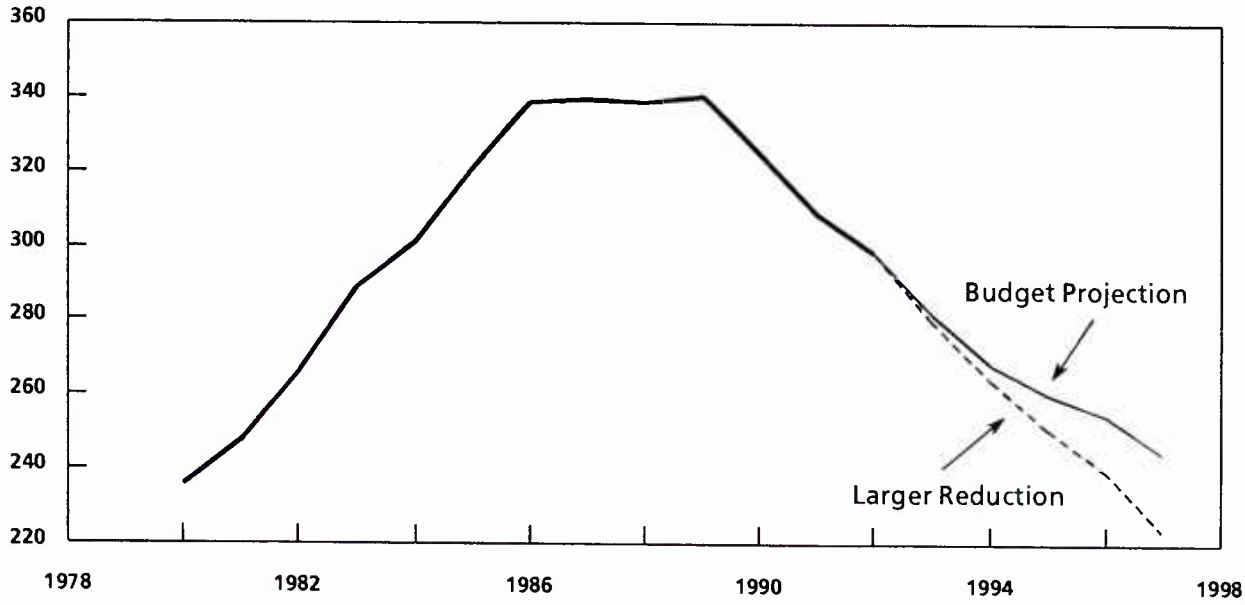
The first scenario reflects the 1991 plan for defense spending, which is consistent with the BEA spending caps and which calls for a 20 percent cut in spending relative to the base case by 1997; the other scenario assumes cuts that occur somewhat more quickly and, by 1997, are about half again as large (see Table 3). Both scenarios, but not the base case, show temporary increases in real defense spending in 1991 that result from Operation Desert Storm. The costs of Desert Storm continue into 1992, but are offset by cuts in other areas of the 1992 defense budget.

All of these scenarios--the base case and the two alternatives--imply large reductions in the share of defense spending in the economy. Defense accounted for 6.4 percent of GDP in 1987, before the most recent reductions began. Since real defense spending falls in the base case while GDP grows, defense by 1997 will amount to only 4.5 percent of GDP, even in the base case. In the scenarios, it would fall further, to either 3.6 percent or 3.2 percent of GDP. Those shares are significantly below that of 1987 and even further below the shares of the 1950s and 1960s, when defense at times accounted for more than 10 percent of GDP.

Although budget authority is the best measure of the resources available to defense, this study focuses on outlays because they more closely reflect the actual flow of defense funds

10. Spending for Operation Desert Storm was exempted from the provisions of the Budget Enforcement Act, and thus is not included in the base case.

Figure 2.
Alternative Defense Spending Paths
(National defense outlays by fiscal years, in billions of 1992 dollars)



SOURCE: Congressional Budget Office.

to the private economy. (Unless otherwise noted, all further references to defense spending should be interpreted to mean defense outlays.)

The Administration's 1991 Plan

The first of the alternative spending paths reflects the defense spending plans already in place for fiscal year 1992, adjusted to reflect the added costs of Operation Desert Storm. In 1992 and 1993, those plans approximate the ceilings imposed under the BEA.[11] The act set a ceiling on defense outlays of $295.9 billion in fiscal year 1992 and $292.5 billion in fiscal year 1993, representing real decreases of 3 percent and 9 percent, respectively, from the 1991 level.

Actual defense spending in 1992 will be substantially higher than the BEA ceiling because of Desert Storm, whose costs are not subject to the ceilings. The Congress has approved supplemental funding of $48.4 billion in budget authority for war-related expenses. That will raise outlays above the prewar levels the Administration proposed by some $23 billion in 1991 and by lesser amounts in 1992 and 1993. Although all of these added costs will be offset by foreign contributions, the additional spending will nonetheless affect the U.S. economy, and those effects are reflected in the results of this chapter. After adding the costs of Desert Storm, real defense spending will exceed the base-case projection by 8 percent in 1991. It will then decline by an average of 9 percent in 1992 and 1993, after adjustment for inflation (see Figure 2).

Beyond 1993, the BEA no longer sets ceilings on defense spending. Under the 1991 plan, described in the Future Years Defense Program for fiscal years 1992-1997, reductions in defense spending would continue. By fiscal year 1997, CBO estimates that defense outlays

11. According to CBO estimates, outlays in certain years exceed the levels permitted by the Budget Enforcement Act because the Administration takes credit for changes that CBO considers accounting changes. Under the act, accounting changes are not to be used to bring budgets into compliance with spending ceilings.

under the Administration's budget projections would total about $245 billion in 1992 dollars--a real reduction of 20 percent below the base case and 28 percent below the 1987 peak, using CBO's assumptions for inflation.

Larger Reduction in Defense Spending

This alternative scenario also reflects the costs of Desert Storm; after 1991, however, it assumes cuts in defense spending larger than the Administration proposed that year. Such cuts would presumably be consistent with political events that lead to continued reductions in defense spending by the former Soviet republics. This scenario would also be consistent with proposals recently made by various Members of Congress for larger defense-spending cutbacks than those found in the 1991 plan.

By the beginning of the next century, application of the peace dividend to deficit reduction will add about $50 billion to annual GNP.

This path assumes that defense budget authority is reduced after 1992 at a rate of 6 percent a year in real terms, roughly double the Administration's projected rate. By 1997, that reduction would result in a cumulative cut of 29 percent in the real level of defense outlays below the base case, mirroring the pattern of reduction the House of Representatives adopted in its fiscal year 1991 Budget Resolution (see Table 3).

Estimated Economic Impacts of the Peace Dividend

In analyzing the economic effects associated with the peace dividend, this study aims not to forecast the path of the economy but rather to isolate the effects of cutting defense spending. The effects of the first scenario are, indeed, already incorporated in CBO's recent economic forecast, which assumes that the spending targets of the BEA, including its caps on defense, are met.[12] The analysis also assumes that monetary and other fiscal policies do not change with defense spending; that is, the growth of the money supply, tax law, and nondefense discretionary spending are assumed to be the same in the base case and in each of the scenarios. (Because alternative assumptions about defense spending affect incomes and jobs, however, there will be some changes in tax revenues and in spending on unemployment insurance and other social programs. Estimates of those changes, derived from economic models, are reflected in the analysis.)

CBO used two econometric models to estimate the economic impact of reducing defense spending. They differ in their theoretical properties, particularly in the degree to which people and markets are assumed to anticipate future economic events. The two models are:

- The Data Resources, Inc. (DRI) Quarterly Macroeconomic Model. This model is among the most widely used for forecasting. It does not anticipate that interest and exchange rates will fall in response to expectations of lower deficits as defense spending is cut.

- The McKibbin-Sachs Global (MSG) model, developed by Warwick

12. CBO, *The Economic and Budget Outlook: Fiscal Years 1993-1997* (January 1992).

McKibbin of the Brookings Institution and Jeffrey Sachs of Harvard. This annual macroeconomic model assumes that financial and other markets anticipate future changes in fiscal policy.[13] In MSG, cuts in defense spending are offset quickly by reduced interest rates, increased investment, and an improvement in the trade balance.

Impacts of the 1991 Plan

The 1991 plan covers the years 1992 through 1997 and calls for reductions in defense spending in each of those years. CBO's analysis assumes that the Administration's cutbacks grow until 1997 and that subsequent defense outlays remain at the same share of GDP as reached in 1997. CBO also assumes that all savings from defense are used to reduce the size of the federal deficit.

Long-Run Impacts. By the beginning of the next century, application of the Administration's proposed peace dividend to deficit reduction is likely to increase the level of real GNP by about six-tenths of one percentage point (see Figure 3, panel 1).[14] That is, the peace dividend will add about $50 billion to annual GNP (in 1992 dollars). That increase in economic activity will not be realized until the late 1990s because, under the 1991 plan, defense spending continues to be cut--and hence continues to depress economic activity--through 1997.

Assuming that the reduction in defense spending persists, improvements in GNP would continue in the next century. At that point, the Administration's cuts--if used to reduce the deficit--could increase GNP by almost a full percentage point. That increase in real GNP would be permanent, provided that the spending cuts were maintained.

Those estimates, from the MSG model, are broadly consistent with others CBO made using various models of the long-run effects of fiscal policy changes on national saving and growth.[15] The DRI model also suggests that defense spending cuts used to reduce the deficit would eventually begin to improve GNP, although the improvements occur later than those predicted by MSG.

The source of the long-term increases in real GNP (illustrated in Figure 3, panels 3 and 4), stems from the increased share of GNP devoted to both investment and net exports. (Since trade deficits must be financed by borrowing from abroad, an improvement in the trade balance corresponds to smaller borrowing.)

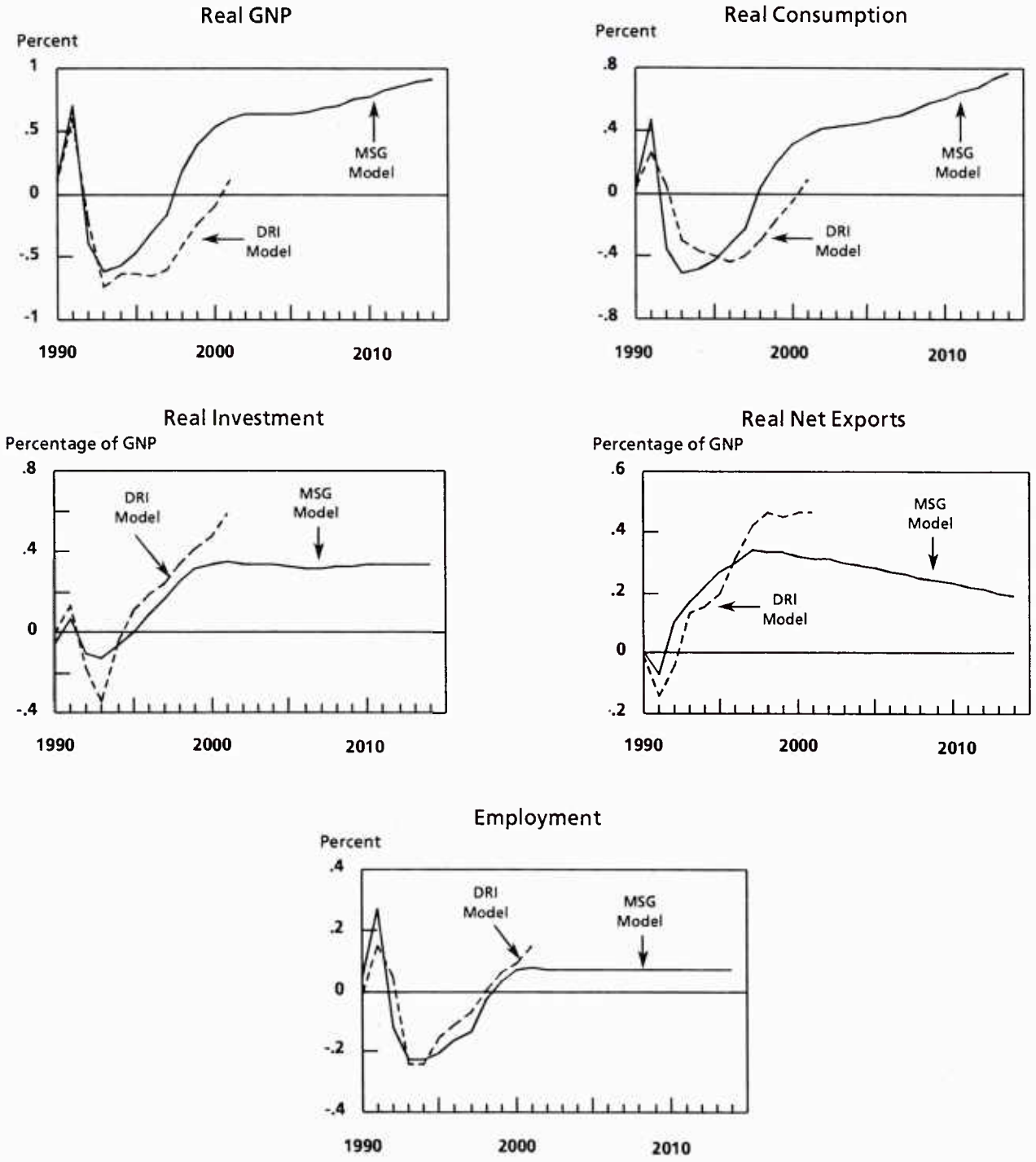
Increases in investment and net exports eventually lead to increases in productive capacity and to higher levels of GNP. The improvements in investment and net exports result because the reduced federal deficit would substantially reduce long-term interest rates. (Defense spending as high as in the base case

13. A description of the McKibbin-Sachs Global model is given in Chapter 3 of Warwick J. McKibbin and Jeffrey D. Sachs, *Global Linkages: Macroeconomic Interdependence and Cooperation in the World Economy* (Washington D.C.: Brookings Institution, 1991).

14. For most purposes, analysts now use gross domestic product as a broad measure of economic activity in the United States. GDP, however, focuses only on the rate of production from resources located in the United States. Consequently, it does not reflect the fact that income from some of the economic activity goes overseas to service debt to foreigners, and is therefore unavailable to U.S. residents. Since alternative fiscal policy assumptions can involve different amounts of borrowing from abroad, it is important to capture the effects of this borrowing. Thus, results are presented in terms of gross national product, which shows how much income is available to U.S. residents.

15. See, for example, CBO, *The Economic and Budget Outlook: Fiscal Years 1990-1994* (January 1989), Chapter 3.

Figure 3.
Effects of Reductions in Defense Spending Under the 1991 Plan



SOURCE: Congressional Budget Office.

NOTES: "The 1991 plan" refers to the planned reductions announced by the Administration in February 1991.
DRI = Data Resources, Inc.
MSG = McKibbin-Sachs Global.

Table 4.
Macroeconomic Impacts of Reducing Defense Spending According to the 1991 Plan (By calendar year)

	1991	1992	1993	1994	1995	1996	1997
Change in Real GNP (Percent)							
DRI model	0.6	-0.2	-0.7	-0.6	-0.6	-0.6	-0.6
MSG model	0.7	-0.3	-0.6	-0.5	-0.5	-0.3	-0.2
Change in Long-Term Interest Rate (Percentage points)							
DRI model	0.3	0.1	-0.2	-0.4	-0.5	-0.8	-0.8
MSG model	0.3	0.2	-0.2	-0.5	-0.7	-1.0	-1.2
Change in Real Investment (Percentages of GNP)							
DRI model	0.1	-0.2	-0.4	-0.0	0.1	0.2	0.2
MSG model	0.1	-0.1	-0.1	-0.1	0.0	0.1	0.2
Change in Real Net Exports (Percentages of GNP)							
DRI model	-0.1	-0.0	0.1	0.2	0.2	0.3	0.4
MSG model	-0.1	0.1	0.2	0.2	0.3	0.3	0.3
Change in Employment (Percent)							
DRI model	0.2	0.1	-0.2	-0.2	-0.2	-0.1	-0.1
MSG model	1.2	-0.4	-0.9	-0.8	-0.7	-0.6	-0.5
Reduction in the Federal Deficit (Billions of current dollars)							
DRI model	-13.9	-6.4	4.0	22.3	39.6	58.6	65.8
MSG model	-23.8	-10.1	6.5	20.5	35.0	49.2	63.2

SOURCE: Congressional Budget Office.

NOTES: "The 1991 plan" refers to the planned reductions announced by the Administration in February 1991.

DRI = Data Resources, Inc.

MSG = McKibbin-Sachs Global.

The effects are expressed as the difference from the base-case results.

would violate the spending caps of the BEA. That could raise interest rates sharply if it signaled abandoning the commitment to reduce deficits.) Lower interest rates make investment more profitable and--by lowering the value of the dollar--also make U.S. goods more competitive in world markets.[16]

The plan's long-run employment effects will be relatively small compared with the effects

16. It has proven very difficult for analysts to find a strong empirical relationship between deficits and interest rates. Nevertheless, the structure of most macroeconomic models implies that a permanent reduction in the federal deficit would reduce interest rates substantially: this also agrees with much accepted economic theory. Two CBO Staff Working Papers review the available evidence. See "Deficits and Interest Rates: Theoretical Issues and Empirical Evidence" (January 1989), and "Deficits and Interest Rates: Theoretical Issues and Simulation Results" (January 1989).

B-2 bomber production facility: Planned cuts in defense spending are expected to eliminate 330,000 private-sector defense jobs by 1995. (Photo courtesy of Northrop Corporation)

on real GNP and consumption (see final panel of Figure 3). Neither of the models reflects any increase in labor supply. Since higher saving and investment increase capital stock and raise real wages, the models' results may somewhat understate long-term growth in both the labor force and employment.[17]

The long-term increases in GNP suggest that, even though the resources freed by the Administration's proposed defense spending cutbacks are not assumed to be used to reduce taxes, higher consumption will eventually result (see panel 2 of Figure 3). The MSG model suggests that under the Administration's proposals, consumption would increase by about 0.3 percent at the turn of the century and by up to 0.8 percent 10 years later.

Short-Run Impacts. Although the defense cuts would increase GNP and consumption in the long term, both would be reduced in the short run if the defense spending cutbacks are used to reduce the deficit (see panel 1 of Figure 3). Those declines will not occur until 1992 because of added defense spending associated with Operation Desert Storm. Increased spending related to the war added more than one-half of one percent to GNP in 1991, and thus to that extent moderated the severity of the recession. The defense spending cutbacks in 1992 and beyond, which are incorporated in CBO's economic projections, help explain why the recovery from the recession is expected to be slow.

Both models predict that the reduction in defense spending after 1992 will reduce real GNP by about the same peak amount--0.6 percent to 0.7 percent--though they differ over the timing and duration of the reduction (see Table 4 on page 15). According to the DRI model, the GNP loss reaches 0.6 percent in 1993 and stabilizes at that level through 1996. The loss according to the MSG model reaches a maximum in 1993, and then reverses

17. The McKibbin-Sachs Global model does not explicitly model employment. (There is a labor-demand variable, but it captures something closer to total hours than to employment.) The employment effects attributed to MSG are derived from an outside calculation that relates employment to the gap between actual and potential GDP. Known as Okun's law, the calculation is a conventional representation of the short-run relationship between output and employment.

immediately: by 1997, the loss is only 0.2 percent.

Those temporary losses of GNP, while important, are quite small compared with ordinary variations in growth: more than seven years out of 10, the growth rate in real GNP changes by at least 0.7 percentage points from the previous year's rate. Recessions typically involve six to 12 times as much lost output as these simulations predict.

Using the peace dividend to reduce the deficit would reduce consumption in the short run.

Cutbacks in employment mirror the reduction in GNP, but, as the DRI and MSG results indicate, they are proportionately smaller than the effects on output. Total employment is around 300,000 lower (a 0.2 percent reduction) in 1993 and 1994 in the DRI simulation; CBO calculations based on MSG indicate a similar figure. Employment subsequently rises and exceeds the base case by the year 2000. These estimates of employment represent the net impact of defense spending cuts, after accounting for the stimulative effect on nondefense sectors of higher investment and net exports, and the consequent creation of nondefense employment.[18]

Those employment changes refer to the whole economy. Employment losses could be larger in the defense sector, where more than 800,000 positions would be eliminated by 1995. About 330,000 of these positions will be lost directly or indirectly in the private sector; 360,000 among military personnel; and 130,000 among civilian employees of the Department of Defense (DoD). That total overstates the number of people who would actually lose their jobs, however, since some positions could be eliminated through normal attrition. Moreover, some defense plants may successfully convert to producing civilian goods, and their workers will not be affected.[19]

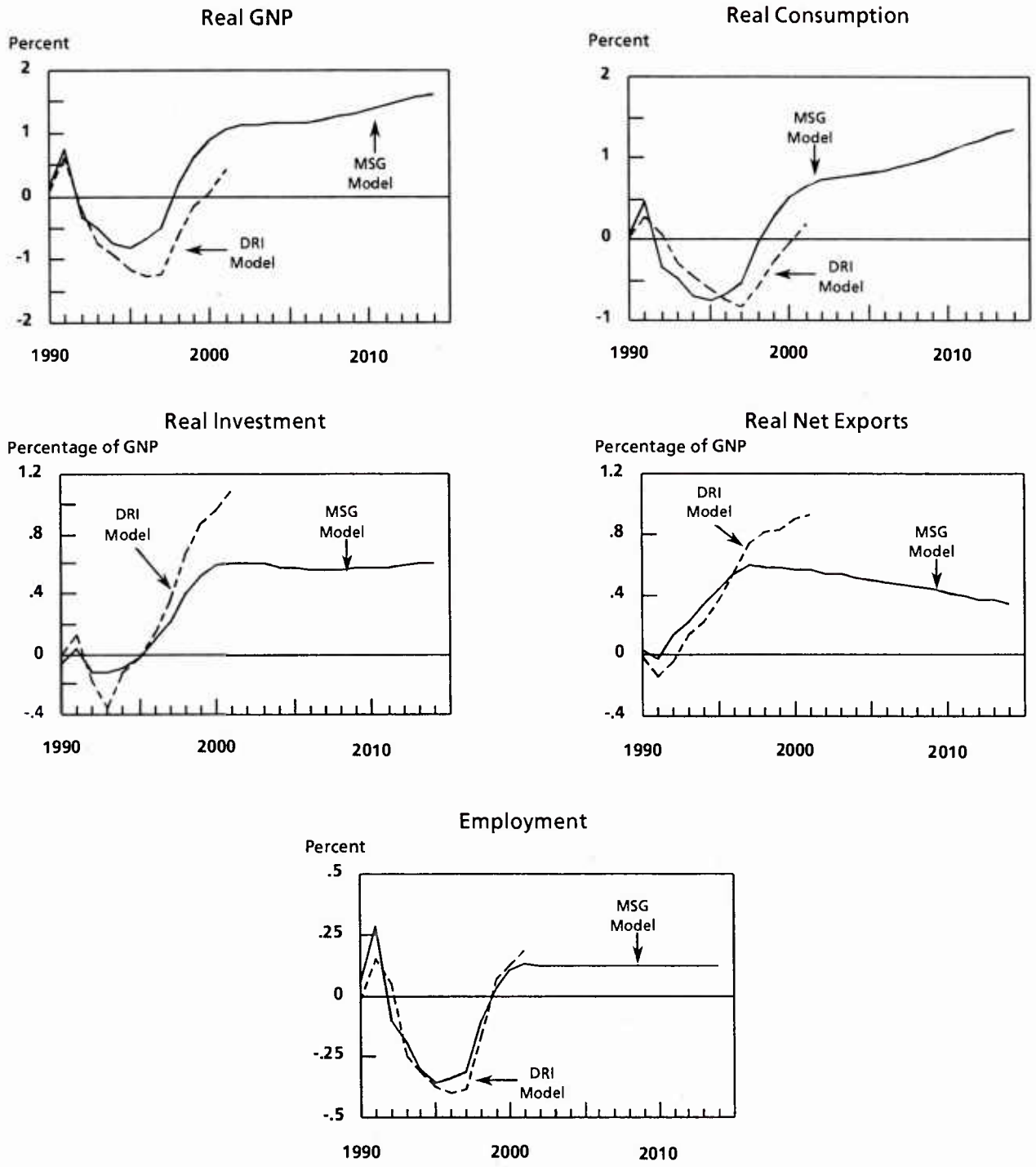
The loss in real GNP predicted for the period 1992-1997 also reflects a temporary decline in investment spending, as businesses trim expansion plans to match the drop in their sales. By 1993, however, according to the models, the share of GNP contributed by real investment will begin to increase as a result of declining real interest rates (see Figure 3, panel 3). Both models predict improvement in the trade balance resulting from a drop in the exchange rate (see panel 4). This increase in investment and net exports sets the stage for the long-run increase in capital stock and real GNP described above.

The models suggest that using the peace dividend to reduce the deficit will reduce consumption in the short run. But they differ over how long the reduction will continue. According to the DRI model, the defense cutbacks reduce consumption consistently during much of the 1990s. By contrast, consumption in MSG turns up several years earlier, and by 2000, it is already about 0.3 percent above its base-case level.

18. The Data Resources Inc. and McKibbin-Sachs Global models constrain spending on defense in order to have the same employment effects as those of nondefense spending. CBO's analysis indicates that the models' assumption is acceptable. See CBO, *Defense Spending and the Economy* (February 1983), which argues that the short-run employment effects of defense and nondefense spending are roughly equal.

19. See Conrad P. Schmidt and Steven Kosiak, *Potential Impacts of Defense Spending Reductions on the Defense Labor Force by State* (Washington D.C.: Defense Budget Project, August 1991), and Robert M. Rauner, "Defense Budget Reductions and Regional Economic Adjustment: The U.S. Experience," paper presented at the International Conference on Conversion: Economic Adjustments in an Era of Arms Reduction, Moscow, August 13 to 17, 1990.

Figure 4.
Effects of Larger Reductions in Defense Spending



SOURCE: Congressional Budget Office.

NOTES: DRI = Data Resources, Inc.
MSG = McKibbin-Sachs Global.

The differences in results stem mainly from important differences in what the models assume about how consumers anticipate future events. In MSG, consumers look forward to the higher real income they will enjoy in the years after 2000; even in the 1990s, they count that future income as an increase in wealth. As a result, consumer spending increases early in the MSG results, turning up in 1994. The DRI model does not reflect any such anticipation by consumers: the upturn in consumption is delayed until 1997.

In sum, the two models represent different judgments in their creators' assumptions about the willingness of people and markets to anticipate events. Financial markets may well treat the Budget Enforcement Act as a more credible commitment to legislative restraint than existed in the 1980s; thus, the DRI model, which does not take into account the BEA's effects on market expectations, probably overstates the duration of the short-run negative effects of the defense spending cutbacks. Alternatively, markets may be less for-

Table 5.
Macroeconomic Impacts of Larger Reductions in Defense Spending (Differences from base-case results)

	1991	1992	1993	1994	1995	1996	1997
Change in Real GNP (Percent)							
DRI model	0.6	-0.2	-0.7	-0.9	-1.2	-1.3	-1.2
MSG model	0.8	-0.3	-0.5	-0.7	-0.8	-0.7	-0.5
Change in Long-Term Interest Rate (Percentage points)							
DRI model	0.3	0.1	-0.2	-0.5	-0.8	-1.2	-1.6
MSG model	0.5	0.3	-0.2	-0.7	-1.2	-1.6	-2.0
Change in Real Investment (Percentages of GNP)							
DRI model	0.1	-0.2	-0.4	-0.1	-0.0	0.1	0.4
MSG model	0.0	-0.1	-0.1	-0.1	0.0	0.1	0.2
Change in Real Net Exports (Percentages of GNP)							
DRI model	-0.1	-0.0	0.1	0.2	0.4	0.6	0.7
MSG model	0.1	0.1	0.1	0.1	0.2	0.3	0.4
Change in Employment (Percent)							
DRI model	0.2	0.1	-0.2	-0.3	-0.4	-0.4	-0.4
MSG model	1.3	-0.3	-0.7	-1.1	-1.3	-1.2	-1.1
Reduction in the Federal Deficit (Billions of current dollars)							
DRI model	-13.9	-6.4	4.0	29.4	56.9	92.4	134.5
MSG model	-25.0	-12.3	2.8	24.5	51.7	79.7	108.3

SOURCE: Congressional Budget Office.

NOTES: DRI = Data Resources, Inc.

MSG = McKibbin-Sachs Global.

The effects are expressed as the difference from the base-case results.

ward-looking than MSG assumes.[20] In that case, the peace dividend could have somewhat more short-run negative impacts on real GNP than MSG indicates.

Despite those important differences, the MSG and DRI models are qualitatively consistent in their predictions. Using the peace dividend to reduce the deficit would work to reduce GNP for a few years, as defense spending reductions continue through 1997; thereafter, GNP and consumption would be permanently higher than if there had been no defense cutbacks.

Although CBO has not explicitly modeled what would happen if the dividend went to increase consumption rather than to reduce the deficit, the results would be quite different. There would probably be little, if any, adverse short-run effect on the economy; but neither would there be the long-term gains in GNP and consumption associated with credible federal deficit reductions. To illustrate the point, imagine carrying out a larger program of cuts in defense spending--such as that described above as an alternative to the 1991 plan. If the reduction in defense spending (over and above the 1991 plan) were transferred to nondefense programs rather than used for deficit reduction, both the short-run adverse effects on the economy and the long-term gains in GNP and consumption would correspond to those from the 1991 plan. The reason: both plans would follow the same path of net deficit reduction.

Impacts of the Larger Reductions in Defense Spending

Larger reductions in defense spending than those in the 1991 plan would produce a similar pattern of results. Assuming that the cuts were devoted to deficit reduction, however, the magnitude of the effects would be larger (see Figure 4 and Table 5).

In this second scenario, defense spending in 1997 runs about 29 percent below base-case level, compared with a reduction of 20 percent under the Administration's plan (with the additional cuts used to reduce the deficit). In this case, early GNP losses would be larger. According to the models, this plan would reduce real GNP by amounts that peak at about three-quarters of one percent of GNP (MSG model) or 1¼ percent of GNP (DRI model) in the mid-1990s. These GNP losses somewhat exceed those that follow from the 1991 plan, which are incorporated in CBO's economic projections. To that extent, therefore, these large defense cuts would further slow the pace of recovery.

The employment effects of this larger decline in defense spending would be considerably more severe, especially in the 1994-1996 period. DRI suggests a net decline of 400,000 employees (0.3 percent of the labor force) in 1994, rising above 500,000 (0.4 percent) in 1996. MSG yields a similar prediction.

The output losses attributable to the defense cuts are eventually reversed, reflecting the long-run forces that work to restore balance to the economy. In the MSG model, the recovery in output is under way by 1996: by the end of the decade, MSG predicts, the larger cut in defense spending will cause real GNP to rise about 1 percentage point above the level that would occur if there were no defense cutbacks and corresponding deficit reductions. Real GNP could eventually rise more than 1½ percentage points above its base-case level, with corresponding improvements in consumption and investment.

20. The McKibbin-Sachs Global model assumes that only about one-third of the economy consists of people who explicitly base their decisions on expected future events--an assumption that allows the model to track the main features of economic developments in the 1980s. But there is little evidence as to the correct proportion, and even one-third may be too high. Efforts at direct estimation put the proportion of consumers who look ahead at between 20 percent and 80 percent (although some scholars believe the correct proportion should be even lower than the bottom of this range). For an overview, see Bernheim, "Ricardian Equivalence: An Evaluation of Theory and Evidence."

Chapter Three

Industrial and State Impacts of Reductions in Defense Spending

Planned reductions in defense spending may have limited implications for the national economy when undertaken as part of an overall plan for improving national saving and long-run economic growth. But they will have a greater impact on those industries and states where defense spending plays an above-average role in generating income and employment. This chapter examines the magnitude of those effects.

The assumptions made by the Congressional Budget Office are described in Chapter 2. The base case assumes that defense budget authority will remain constant at its 1991 level in real terms through 1997. Even in that base case, defense spending (outlays) decline by about $16 billion by 1993 as a result of budget cuts enacted in fiscal year 1991 and earlier. According to the 1991 plan, the alternative case imposes reductions in defense spending for the 1992-1997 period. (For 1993 through 1995, that plan conforms to the discretionary caps specified in the 1990 budget summit.) Spending for fiscal years 1991 and 1992 was adjusted to reflect the expenditures associated with Operation Desert Storm; after adjustment, total defense expenditures actually rise in 1991, and the rate of decline in defense spending is reduced in 1992.

Although CBO made annual forecasts for the 1992-1997 period, the analysis in this chapter focuses on the results for 1995. By then, Desert Storm spending will no longer be a factor. Furthermore, the majority of the Administration's force and personnel reductions (as specified in Chapter 1) are to be accomplished by 1995, although budget projections call for a continued real decline in national defense spending of about 3 percent annually through 1997.

Reductions in Defense-Related Employment

The macroeconomic analysis presented in Chapter 2 suggested that 1995 gross domestic product might be reduced by about $50 billion (in 1992 dollars) as a result of the defense budget cuts in the Administration's February 1991 plan. Employment losses associated with a decline of that magnitude approximate 300,000.

Those overall macroeconomic changes represent the net difference between two distinct measures: (1) *defense-related jobs lost* as a result of less defense spending and (2) *non-defense jobs gained* because of the positive effects of reducing the deficit. As explained in Chapter 2, in the short run, the balance between those two quantities is weighted toward the defense losses; in the long run, as lower deficits register their cumulative positive impact on the economy and defense spending ceases to decline, the balance will shift to the positive factors and the economy will experience a net gain.

In assessing the economic effects of cutting defense spending, both net and gross effects

Navy personnel observe a 1988 exercise: The Defense Department plans to cut 360,000 active-duty military personnel by 1995. (U.S. Navy photo.)

merit consideration. Net effects are important when assessing the performance of the overall economy and in judging the fiscal and budget policies that determine the results: they represent the national "bottom line." But gross defense-related job losses may better capture the extent to which firms and workers will have to adapt to a new economic situation. Thus the estimates presented in this chapter make use of both measures.

Gross Employment Losses Associated with the Defense Reductions

By 1995, a total of about 1.1 million defense-related positions will be eliminated by the defense budget decline. They include about 400,000 direct defense jobs in private industry--workers at plants that make weapons or other products for the Department of Defense, provide goods or services for military bases, do research or perform legal, business, or transportation services that are paid for *directly* by the DoD. Another 200,000 losses will occur in jobs that are indirectly defense-related--that is, that supply goods or services to defense contractors.

Together, the direct and indirect private sector losses represent a decline of 600,000 jobs by 1995. To that sum must be added the 360,000 active-duty military personnel and 130,000 federal government civilians who will be eliminated from DoD payrolls over the same period under the 1991 plan. Thus some 1.1 million positions in the public and private sector will be affected by 1995.

Not everyone who currently occupies one of those positions will actually become unemployed: some companies will successfully develop new civilian products to replace lost DoD contracts, and their workers may be retained. Suppliers of electronic components will not care if orders from a new VCR plant in Indonesia, for example, take up the slack when a military aircraft factory they have been supplying closes. But the gross job loss estimates do indicate the extent to which a new source of business must be found to offset the loss of DoD orders.

Effects on Specific Industries

In most industries, the effect of the defense spending reductions under the 1991 plan will be negligible.[1] For each of some 420 industries for which estimates are available, CBO compared estimates of industry shipments over the 1991-1995 period in the base case with those that result from the 1991 plan. Of

1. The Office of Management and Budget, on the advice of the Bureau of the Census and other federal statistical agencies, defines industries and classifies them into larger industry groups (Office of Management and Budget, *Standard Industrial Classification Manual*, 1987). Although the modeling system identifies most so-called four-digit industries, some are represented only as collections of several four-digit industries or three-digit industry groups. In this study, the term "industry" is used to represent these aggregates as well.

the 420 industries, 362 (86 percent) experience a decrease in shipments of 1 percent or less in their worst year. Of the 58 industries (out of 420) for which the decrease in shipments is more than 1 percent, only six suffer as much as a 5 percent decrease.

Effects on Defense Industries

What would be the outcome of the 1991 plan for the 14 industries most heavily dependent on defense production? Most of these industries are readily identified with the defense industrial base: tanks, guided missiles, shipbuilding, explosives, aircraft, ordnance, and ammunition. Others on the list include communications equipment (which also covers such items as radar and electronic warfare apparatus), small arms, nonferrous forgings (an indirect supplier of components to defense industries), and engineering and scientific instruments. For those industries, whose dependence on defense sales in 1990 ranged from about 20 percent up to 100 percent, the reduction in defense purchases has major implications: sales in 1995 fall by between 1 percent and 17 percent relative to the base case simulation (see Table 6). Cutbacks at nuclear weapons production facilities are discussed in Box 2.

Employment Effects

Reductions of this magnitude will generate significant losses of jobs in the affected industries. Table 7 shows estimated defense-related jobs for selected industry groups. Defense-related jobs totaled some 2.9 million in 1991, including 1.75 million directly attributable to defense spending and another 1.15 million indirectly attributable to it.

By 1995, if reductions proceed according to the 1991 plan, some 600,000 defense-related jobs will be eliminated from these industries. Aerospace leads the list with a loss of 87,000 jobs, followed by communications equipment with 82,000 losses, and construction with 81,000. Not all of those losses are attributable to the end of the Cold War. Of the 600,000

Table 6.
Effects on the Defense Industrial Base Associated with the 1991 Plan

Industry	1990 Output (Billions of dollars)	Defense Share of 1990 Output	1990-1995 Output Change (Percent)	Effect on Output of the 1991 Plan
Tank and Tank Components	2.4	100	-36	-17
Shipbuilding and Repair	12.3	99	-11	-6
Complete Guided Missiles	17.5	84	-16	-2
Other Ordnance and Accessories	2.9	51	0	-7
Explosives	1.6	44	-9	-3
Aircraft, Missile Engines	34.5	43	0	-2
Communications Equipment	67.6	42	9	-3
Aircraft	60.7	40	10	-1
Nonferrous Forgings, n.e.c.	1.7	35	20	-2
Aircraft, Missile Equipment	45.3	27	13	-1
Small Arms Ammunition	1.8	26	5	-2
Ammunition, Except Small Arms	7.3	24	-10	-2
Small Arms	1.8	19	2	-1
Engineering and Scientific Instruments	7.5	18	21	-1

SOURCE: Congressional Budget Office.

NOTES: "The 1991 plan" refers to the planned reductions announced by the Administration in February 1991.

n.e.c. = not elsewhere classified.

Box 2.
The Nuclear Weapons Cutback

The Department of Energy (DOE) has primary responsibility for developing, producing, and maintaining U.S. nuclear weapons. The department oversees a large and geographically diffuse nuclear weapons infrastructure, with 15 major sites in 13 states, about 100,000 employees, and an annual budget of roughly $12 billion. A previous study by the Congressional Budget Office, *The START Treaty and Beyond* (October 1991), estimated that under Administration plans as they stood in late 1991, the budget might average $13.4 billion a year over the next 15 years.

Although the scale of new nuclear weapons programs presumably will now be reduced, the extent to which DOE's activities will also be reduced is not yet clear. For one thing, the idea of continuing to modernize the U.S. nuclear arsenal still enjoys support in the Congress and elsewhere. For another, DOE is charged with cleaning up the serious environmental problems that suffuse the nuclear weapons complex. In addition, warheads that remain in the arsenal must be maintained.

At this point, some cuts in the U.S. nuclear arsenal have been made. Were more ambitious arms control to occur in the future, DOE spending could decline by as much as 15 percent. For example, under a force structure that cut nuclear warheads to a total of 5,000--in contrast to the present 20,000-plus--average annual spending might decline by $2.0 billion from the anticipated level of $13.4 billion.

DOE has announced plans for certain sites. The Fernald, Ohio, uranium processing center is slated for decommission and the Rocky Flats, Colorado, plutonium processing and component manufacturing plant for eventual shutdown. The Idaho National Engineering Laboratory also may be shut down.

Some other facilities will probably undergo a reduction in size. They include Savannah River in South Carolina (tritium and plutonium production), Hanford Reservation in Washington State (plutonium production and processing), and the Pantex facility in Texas (warhead assembly and disassembly). The several plants making nonnuclear components for weapons might be consolidated into a single operation in Kansas City, Missouri. Internal consolidation is also expected at the three national laboratories: Livermore, in California, and Los Alamos and Sandia, in New Mexico. Operations at the Nevada test site will continue.

Contrary to what these plans may suggest, data released in December 1991 confirm that DOE budgets and payrolls are unlikely to change much under current Administration plans. While announcing that about 18,500 employees at DOE facilities will lose their jobs over the next 15 years, DOE Secretary James D. Watkins also pointed out that 16,500 workers will be added by 1998 to expand cleanup operations.

Things would be different, though, if deeper cuts are made in the nuclear arsenal. Assuming that employment figures would track overall spending levels, the number of people involved in DOE work might decline by some 15,000, to 85,000. It is difficult to predict the impact of such a reduction--in numbers or rate of implementation--on individual sites. The extensive cleanup necessary at most sites that might be shut down would stretch out the closing process and, with it, the adjustment the adjacent community faces.

Table 7.
Employment Effects of the Reduction in Defense Spending Planned in 1991 (In thousands of jobs)

Industry Group	Defense Employment			Employment Changes Associated with Defense Cuts	
	1991 Estimate	1995 Projected	Change	Through 1991	1992-1995
Construction	393	312	-81	-2	-79
Metal Products	110	84	-26	-14	-12
Miscellaneous Nonelectrical Machinery	54	43	-11	-6	-5
Communications Equipment, Electronic Components	265	183	-82	-64	-18
Aerospace	411	324	-87	-76	-11
Shipbuilding and Boatbuilding	65	44	-21	-14	-7
Instruments	29	22	-7	-5	-2
Trucking and Buses	110	85	-25	-8	-17
Wholesale Trade	180	152	-28	-7	-21
Eating and Drinking Places	108	98	-10	1	-11
Hotels, Repair Services	85	68	-17	-6	-11
Business Services	413	366	-47	7	-54
Subtotal	2,223	1,781	-442	-194	-247
All Other Industries	686	527	-158	-77	-81
Total	2,908	2,309	-600	-271	-329

SOURCE: Congressional Budget Office using the INFORUM model.

defense-related jobs projected to disappear between 1991 and 1995, 271,000 will result from reductions in national defense budget authority for fiscal year 1991 and earlier--that is, before the cuts that are the subject of this analysis.[2] The remaining 329,000 losses stem from the additional reductions in the defense budget specified in the 1991 plan.

Larger Reductions in Defense Spending

Larger reductions in defense spending seem probable in the next few years. Were defense spending to decline at a 6 percent annual rate from 1991 to 1995, rather than the roughly 3 percent annual rate in the 1991 plan, job losses in the defense sector would increase. CBO's analysis indicates that the larger reduction would result in a decline of about 1.41 million defense-related jobs; 1.14 million of those would be the result of the 1991 plan, with the remaining 271,000 attributable to budget cuts before 1991. (Table 8 presents the details for private industry.)

Under those assumptions, some 127 of the 420 industries, or 30 percent, would experience a drop of at least 1 percent in sales, as opposed to the 58 industries so affected under the 1991 plan. For the group of 14 defense industries previously noted, percentage decreases would range from 5 percent to more than 50 percent.

Inevitable Losses in Employment and Output

It seems unlikely that the adverse effects on defense industry employment just described will be offset by gains in related markets. One possible remedy is to actively promote growth in foreign military sales in order to offset the decline in sales to the DoD. The substantial orders for U.S. military equipment by Gulf states in the wake of Iraq's occupation

2. Reductions in budget authority made before 1991 still result in outlay reductions in the 1992-1995 period, and thus reduce the level of defense-related economic activity during those years.

of Kuwait could boost economic activity in some defense industries. In the wake of the invasion of Kuwait, some $13 billion in orders from Saudi Arabia were placed in fiscal year 1991. An additional Saudi order for Patriot missiles, totaling about $3.3 billion, was submitted by the Administration to the Congress in December 1991. Those orders, and others that may be forthcoming in view of the performance of U.S. weapons in the conflict, could help extend for a year or two production of many systems that DoD no longer plans to buy. However, they are not reflected in the above results.

Yet prospects for increases in foreign military sales are limited. Other NATO members are reducing their defense spending just as the United States is; sales to them are likely to fall, and their own defense manufacturers will be increasing their efforts to compete with U.S. firms for foreign orders. Furthermore, a policy of actively promoting arms exports to the most likely source of increased sales--the Arab countries of the Middle East--would probably spark controversy in the Congress. Middle East arms sales also risk creating imbalances of military forces that might lead to future conflicts in which U.S. interests would be threatened.

Converting from defense to nondefense production represents another means of offsetting the adverse effects of defense spending cutbacks. Some companies have taken steps to convert to nondefense production, and the Congress has facilitated the conversion of plants to nondefense uses and has tried to mitigate the effects of personnel layoffs. During past defense drawdowns, however, specialized defense companies have had only mixed success in converting to the production of civilian items.

Losses in defense-related jobs need to be assessed in terms of the economy's ability to create new nondefense jobs. When the current recession ends, growth in employment will return to its long-term average of about 1.5 percent a year. That translates to a net

Table 8.
Employment Effects of the Larger Reduction in Defense Spending (In thousands of jobs)

Industry Group	Defense Employment 1991 Estimate	Defense Employment 1995 Projected	Defense Employment Change	Employment Changes Associated with Defense Cuts Through 1991	Employment Changes Associated with Defense Cuts 1992-1995
Construction	393	214	-179	-2	-177
Metal Products	110	67	-43	-14	-29
Miscellaneous Nonelectrical Machinery	54	26	-28	-6	-22
Communications Equipment, Electronic Components	265	151	-114	-64	-50
Aerospace	411	276	-135	-76	-59
Shipbuilding and Boatbuilding	65	35	-30	-14	-16
Instruments	29	19	-10	-5	-5
Trucking and Buses	110	82	-28	-8	-20
Wholesale Trade	180	138	-42	-7	-35
Eating and Drinking Places	108	89	-19	1	-20
Hotels, Repair Services	85	68	-17	-6	-11
Business Services	413	321	-92	7	-99
Subtotal	2,223	1,486	-737	-194	-545
All Other Industries	686	509	-177	-77	-100
Total	2,908	1,995	-914	-271	-645

SOURCE: Congressional Budget Office using the INFORUM model.

gain of about 1.85 million jobs annually. The entire decline in defense-related jobs over the four-year period 1991-1995 is roughly two-thirds of the jobs gained in a single year.

Effects on the States

Not surprisingly, the major impact of a reduction in defense spending will be felt in those states whose economies depend most heavily on defense. Measured in terms of dollar levels of defense spending, California leads the list. Direct defense spending there during 1991 was estimated at $60.7 billion--more than 19 percent of the national total. After California, the largest amounts of direct defense spending occurred in Virginia ($22.1 billion) and Texas ($22.0 billion). Florida, New York, Pennsylvania, Maryland, Washington, Georgia, Massachusetts, Missouri, and Ohio are also major beneficiaries of defense spending (see Table 9).

All of those are large states with well-developed and broad-based economies. The rankings remain roughly the same if defense spending includes not only dollars received directly from the Pentagon but also such indirect effects as spending in industries that provide support to defense workers (as shown in the third and fourth columns of Table 9).

If the importance of defense spending is measured relative to the size of a state's economy, however, some states with smaller economies join the list of the heavily dependent. In terms of percentage of state output devoted to defense, Alaska and Hawaii, both of which have several large defense bases, would be among the top 10 states, as would Mississippi. For those three states. output for defense exceeds 8 percent of their total economy. (That is also true for Washington, California, Maryland, and Virginia, which are among the states noted earlier as having the largest absolute dependence on defense spending.)

Net Impact of the 1991 Plan

For most states, the Administration's 18 percent reduction in defense spending will have a negative but relatively small economic effect by 1995. In only eight states as well as the

Table 9.
Impact of Defense Spending on Selected States, 1991 (In billions of dollars)

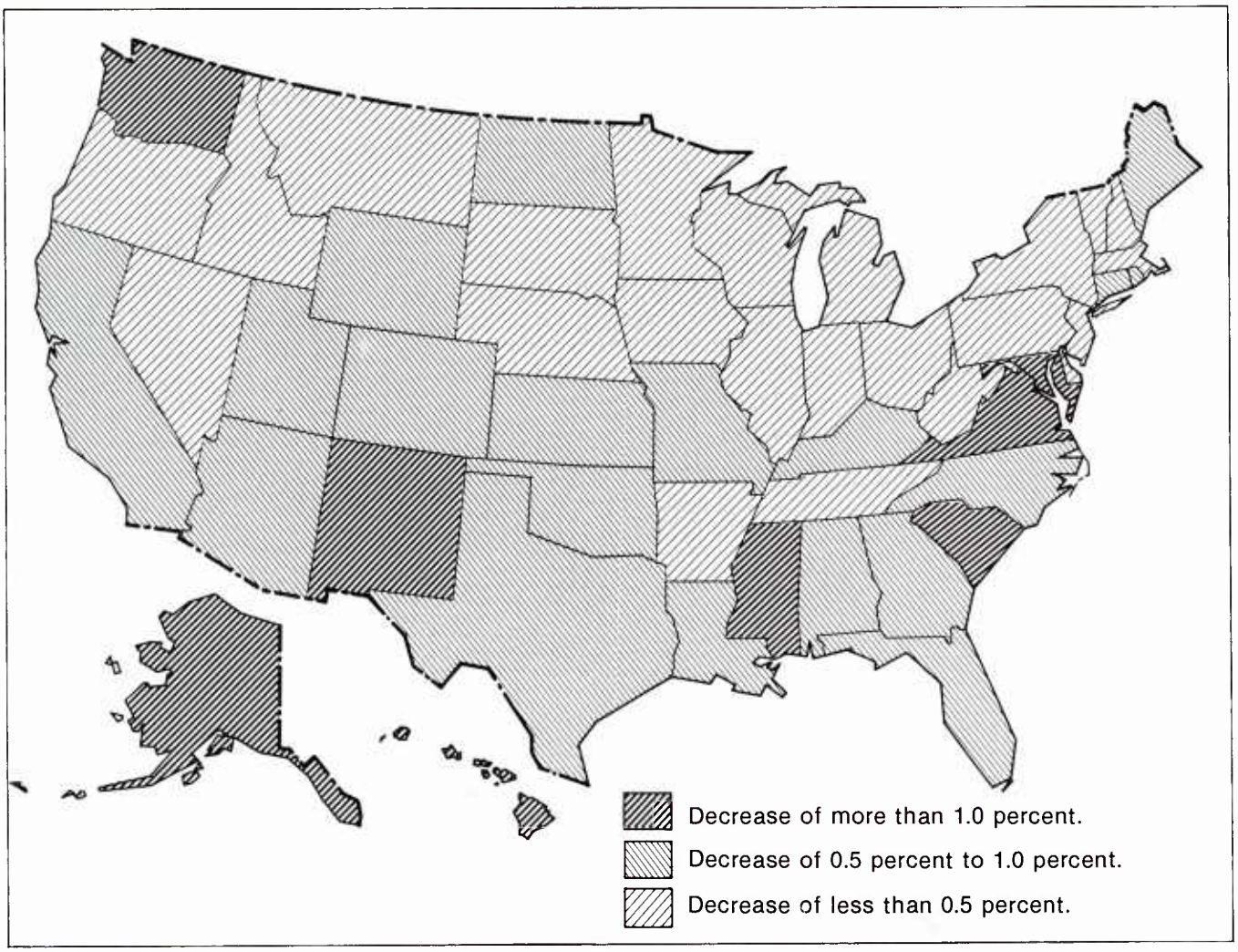
State	Direct Defense Spending		Direct and Indirect Defense Spending	
	Amount	Rank	Amount	Rank
California	60.7	1	99.3	1
Virginia	22.1	2	38.4	3
Texas	22.0	3	42.8	2
Florida	15.0	4	25.2	5
New York	14.4	5	25.5	4
Pennsylvania	10.0	6	22.0	6
Maryland	9.9	7	17.2	9
Washington	9.8	8	16.7	10
Georgia	9.5	9	17.7	8
Massachusetts	9.1	10	16.1	11
Missouri	9.0	11	14.9	12
Ohio	8.6	12	19.8	7

SOURCE: Congressional Budget Office using the INFORUM model.

District of Columbia would the decline in state output exceed 1 percent (see Figure 5). Applying the cuts proposed by the Administration in 1991, no state or jurisdiction would experience a decline in output of more than 3 percent; Hawaii, with a 2.6 percent decline, suffers the greatest relative impact in the simulation.

On the other hand, many states not heavily dependent on defense spending might expect to feel little effect. Although that is primarily because of their small defense sectors, it also reflects the positive economic effects associated with reducing the federal deficit. The 10 states that would be least affected are Idaho, Illinois, Iowa, Michigan, Minnesota, New York, Oregon, Vermont, West Virginia, and Wisconsin. All of those would experience a decline of 0.25 percent or less by 1995.

Figure 5.
Decrease in State Output by 1995 Under Defense Cuts Planned in 1991



SOURCE: Congressional Budget Office using the INFORUM model.

NOTE: U.S. average is a 0.6 percent decline.

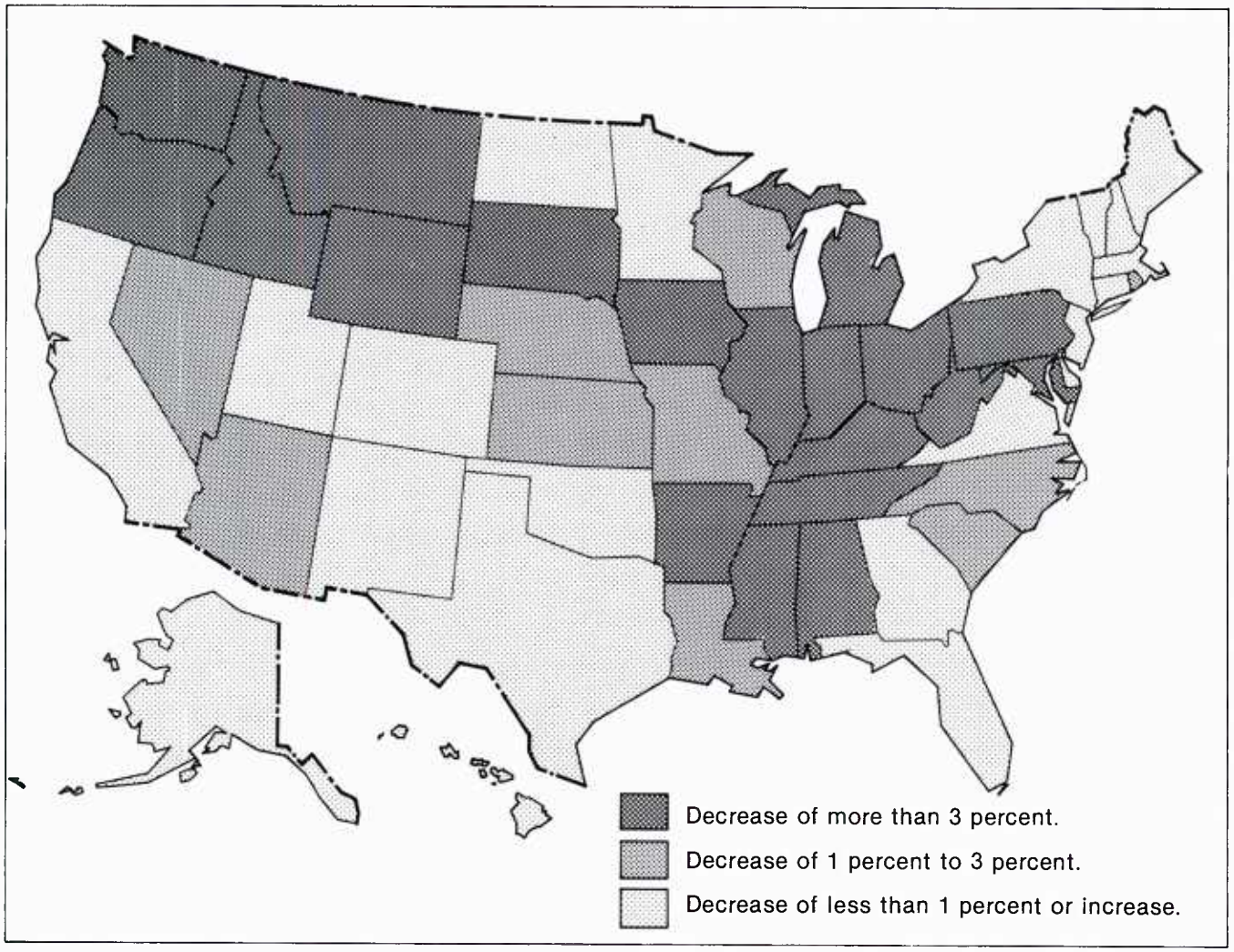
Effects of a Larger Defense Cut on the States

Under the larger cuts described earlier, 10 states (the eight shaded darkly in Figure 5 plus Connecticut and Kansas) would experience a decline of 1 percent or more by 1995. If the larger reductions were applied to reducing the deficit, as was assumed for the 1991 plan, then positive economic offsets would also be larger by 1995. This increase could mean that for many of the states least dependent on defense, the outcome would be a net economic gain perhaps by 1995 and certainly by 1997. For the most dependent, positive effects might be deferred until the end of the decade.

Different Regions' Sensitivity to Defense Cuts

The Administration's planned cuts will mainly fall on regions and states near a coast: New England (except Vermont), the Middle Atlantic States, the Gulf Coast states, California,

Figure 6.
Impact of the 1981-1982 Recession on State Economies (As a percentage of gross state output)



SOURCE: Congressional Budget Office based on data from the Bureau of Economic Analysis.

Washington, Alaska, and Hawaii. That finding reflects the tendency of defense firms to locate in high-tech centers on the east and west coasts, as well as the tendency of the military services to locate their bases (not to mention shipyards) on the geographical periphery of the United States.

That distribution of economic losses from reduced defense spending differs from the pattern observed in the recession of 1981-1982 and the last major economic downturn. That recession was one of the most serious the nation has experienced: the unemployment rate rose to over 10 percent, and GNP declined by 2.8 percent (measured from the peak quarter to the subsequent trough). In 1982, 18 states experienced a year-to-year decline of more than 3 percent in gross state output. Those states were clustered in the heartland--the Midwest, Great Plains, and Rocky Mountain states (see Figure 6). That pattern reflected the 1982 recession's impact on manufacturing activity and agricultural income.

In short, the impact of defense cuts will fall disproportionately on states that largely escaped the effects of the 1981-1982 recession. In the current situation, however, when defense spending reductions are taking place in the midst of a weak economy, the above analysis suggests that few states will avoid experiencing sluggish growth in 1992.[3]

Methodology

To derive the results above, CBO relied on simulations performed using the INFORUM modeling system.[4] INFORUM consists of several components: an annual macroeconomic simulation model--the Long-Term Interindustry Forecasting Tool; a Detailed Output Model to predict effects on specific industries; and models that estimate economic activity for each of the 50 states and the District of Columbia. (The model's methodology is described in detail in Appendix A.)

3. Although data on state incomes and output for 1991 are not yet available, data for the early months of that year suggest an atypical recession pattern: the Far West (chiefly California), New England, and the Middle Atlantic states have experienced the worst economic performance. Although suggestive of the effects of defense cuts, that result may be attributable to nondefense factors as well. Chief among the factors is the decline in new construction activity in those regions because of an oversupply of commercial office space and declining real estate values.

4. INFORUM is a group of models developed and maintained by the Interindustry Economic Research Fund at the University of Maryland.

Chapter Four

Effects of Defense Cuts on Local Communities

When asked to distinguish between a recession and a depression, an economics professor replied, "When a lot of other guys lose their jobs, it's a recession. When YOU lose your job, it's a depression." Even if the impact of defense reductions on the overall economy is judged manageable, communities whose economic bases are closely linked to defense spending may find the "managing" very difficult--especially in terms of job loss.

The Congressional Budget Office selected three defense-dependent locales--in different regions and with varied economies--to illustrate the potential short-term economic impact and the prospects for long-term recovery at the grass roots. The areas are Monterey County, California; southeastern Maine; and St. Louis, Missouri. The following analysis examines the potential impact of closing Fort Ord in Monterey County and of reducing or canceling defense contracts with firms located in Bath, Maine, and St. Louis, Missouri. The cases were selected to illustrate the potential effects of different types of cutbacks, as well as different situations faced by the various military services as they reduce their spending. None of the cases is directly related to either of the possible scenarios for spending cuts defined in Chapter 2. Rather, they represent the types of specific actions that would be required to achieve major reductions in defense spending.

In the cases examined and in the situations they are intended to illustrate, successful economic recovery will be affected by a variety of factors. Recovery for communities affected by base closures, such as that of Fort Ord, will not be automatic. Much will depend on effective planning and a timely transition to reuse. Planners must identify the best ways to capitalize on a base's principal assets: housing, a hospital, an air base, recreational facilities, and so forth. The degree of economic disruption will be directly related to the speed with which the reuse can be instituted--while addressing cleanup demands and other environmental problems in a timely fashion.

For such areas as south coastal Maine, heavily dependent on defense spending and possessing few alternative industries, cuts in defense contracts could have serious short- and long-term repercussions. For areas with larger, more diverse economies--such as St. Louis--the impact could be more severe in the short-term, but prospects for long-term recovery are better. The overall state of the economy will largely determine the rate and extent of long-term recovery in St. Louis and similar urban locales.

It is important to note that CBO has not analyzed the merits of cutbacks in these three areas. The sole intent of this analysis is to illustrate the difficulties that defense-dependent communities could face as military spending declines over the next several years.

Box 3.
Fort Ord, California

Located a few miles north of Monterey, Fort Ord comprises about 28,500 acres extending several miles inland from Monterey Bay. The post is the home of the Army's 7th Infantry Division (Light) and such related base-support units as the medical detachments assigned to the Silas B. Hays Army Community Hospital, a 440-bed, full-service facility located on post. Fort Ord also serves as the main training facility for the 7th Division as well as the California National Guard and Army Reserve Units located south of San Jose. The Army has designated the post as a processing and training center in the event of a major mobilization.

The fort provides administrative and logistical assistance to other defense installations in the area. It supports, for example, the training and testing facilities located at Fort Hunter Liggett about 70 miles to the southeast. The Presidio at Monterey also draws upon the post for operations, maintenance, and logistics support, primarily for the students and staff of the Defense Language Institute. Fort Ord provides similar assistance to the faculty and staff of the Naval Postgraduate School and the Coast Guard Station in Monterey. The Silas B. Hays hospital supports health clinics located at each of these installations.

Active duty and retired military personnel and dependents who reside in the Monterey area--some 44,000 people in all--are eligible to use most of the post facilities. Those include the post exchange, commissary, library, chapel, and various recreation facilities.

Closing Fort Ord in Monterey, California

Last year, the Congress approved closing Fort Ord, which houses the 7th Infantry Division (Light), since the Army will have excess capacity for its active divisions by 1995. (See Box 3 for a description of Fort Ord.) Department of Defense criteria for deciding on bases to close direct that local economic impact be taken into account. The analysis in this section illustrates the economic problems facing many communities dependent on military bases, by examining the effects of closing Fort Ord on Monterey and the surrounding region.

Short-Term Economic and Employment Effects

In the short term, closure will probably have a significant impact on the economy.[1] That is true in part because of the large number of people involved: some 35,323 active-duty military personnel, DoD civilians, and their dependents are assigned to Fort Ord or depend upon it for their livelihood. (As of March 1990, the post actually employed 15,792 military personnel and 3,764 civilians.) Under the current Army plan, the 7th Division--which accounts for about two-thirds of all the military personnel that would be affected--would be transferred to Fort Lewis, Washington; the other military units on the post would either be transferred or disbanded. Fort Ord's civilian employees would lose their jobs. (Many might exercise their right to take a civil service job elsewhere, which would ease the effect on individuals but not on the local area.)

Fort Ord's military and civilian personnel, plus dependents, constitute a substantial portion of the local population: about 9.8 percent of Monterey County and about 15.8 percent of the local impact area.[2]

1. In this section, "short-term" means the period after closure has taken place but before the base has been put to other uses.

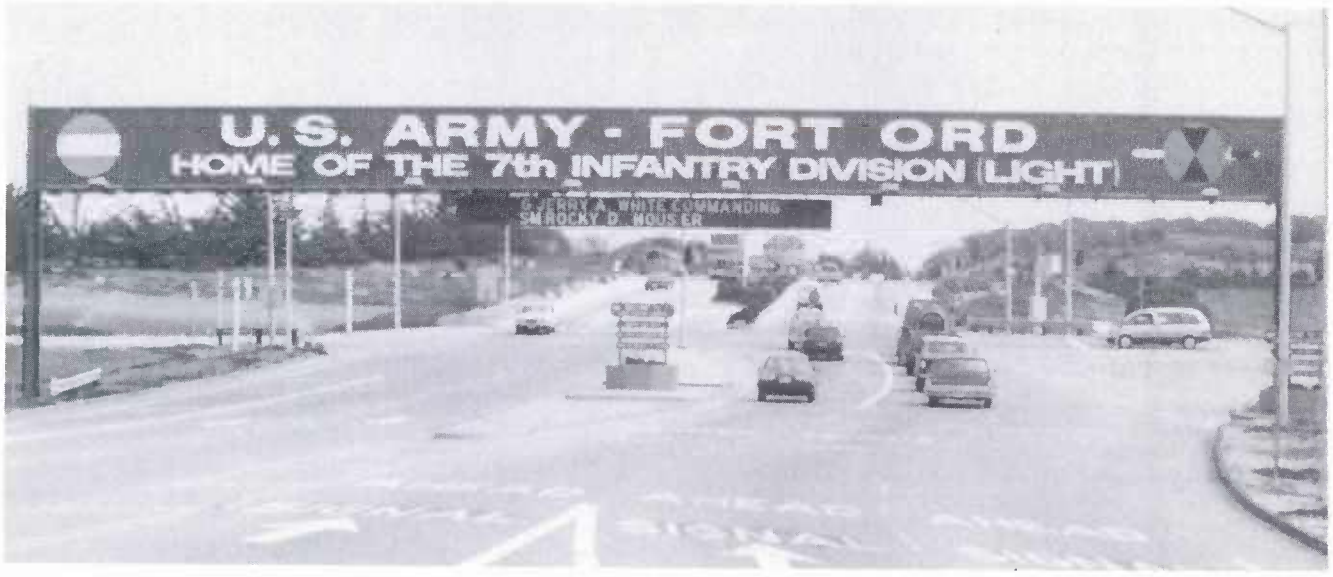
2. The local impact area is defined as the communities of Marina, Monterey, Pacific Grove, Salinas, Sand City, and Seaside.

Effects on Employment. Because of this substantial association, closing the base is likely to increase short-term unemployment significantly--in a region where the unemployment rate is already relatively high. (The average annual rate for Monterey County was 8.8 percent in 1990, compared with the national average of about 5.5 percent.) If the 3,764 civilians employed at Fort Ord remained in the area and could not find other jobs, local unemployment could increase by about 2 percentage points. That could create a particular problem in winter. Because of seasonal effects, local unemployment then can run as high as twice the current annual average. In January 1991, for example, it reached 16.5 percent.

Nor would these 2 extra percentage points represent the full effects on short-term unemployment. DoD estimates that for every military and civilian job that is lost to a community as a result of a base closing, the local economy generally experiences the loss of another half job in businesses that provide services to base employees. With that indirect effect added, the short-term unemployment rate for the Monterey Labor Market Area could increase by as much as 8 percentage points when Fort Ord is closed.

Those figures represent a worst case. The calculations are estimates of potential short-term unemployment that do not reflect any reuse of base facilities. And new uses aside, other factors that are not considered here might help offset the adverse short-term effects on employment. For example, more than 12,000 active-duty military personnel from other military installations in the area, together with their dependents, now shop at least occasionally at Fort Ord commissaries and exchanges. After the base is closed, some of those shoppers might make the same purchases at independent local stores; many of the 18,500 retired personnel and their dependents residing in the region might also shift their spending to the local economy.

Effects on Local Income. Closing Fort Ord will also have adverse short-term effects on local income. In 1990, the post generated $558.4 million in wages and salaries, approximately 31 percent of the earnings in Monterey County. Local commerce will suffer without this income. Based on 1990 estimates, the region could lose about $290 million in direct retail sales. The figure includes personal spending of military and civilian personnel employed by the post as well as the local purchases made by the base to support its opera-



Entrance to Ford Ord: The post was selected for closure by the Base Closure and Realignment Commission in 1991. (Photo courtesy of Fort Ord.)

tions.[3] Taking into consideration indirect spending--additional spending generated by direct purchases--regional retail sales could be reduced by about $350 million.[4] In that case, retail sales in Monterey County would be reduced by more than 15 percent, and in the area of immediate impact by about 25 percent. (As with the estimates of short-term effects on unemployment, those income calculations consider neither the effects of putting the base to new use nor other potential responses the economy might make to offset economic losses.)

Effects of Closing Silas B. Hays Hospital. Closing the hospital will have a major effect on the health care available to active-duty and retired military personnel and their dependents--about 5.4 percent of the county's population--who will lose access to the region's largest full-service medical facility. They will have to rely instead on the following: four DoD clinics, providing limited services, located in Salinas and at three other local military installations;[5] the nearest full-service military hospital (Oak Knolls), about two hours away; and public and private hospitals in the area.[6] The DoD clinics will have to replace the administrative, professional, and logistics support currently provided by Hays hospital in order to maintain the current level and quality of their services.

Service personnel, retirees, and their families will be authorized to use civilian hospitals in the area if the services required are not available at the clinics in the area. Under such circumstances, the costs of services would be financed through an insurance program known as the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS). The Army has estimated that closing the Hays hospital could increase CHAMPUS costs by about $25 million per year. Overall CHAMPUS costs to the government might not increase, however, if the additional local costs in Monterey are offset by transferring the services formerly available at the hospital to another region and, as a result, reducing CHAMPUS costs in another area.

Although some special medical needs currently provided for at Hays will have to be met outside the area, its civilian hospitals can accommodate the health care needs of military personnel and their dependents. The total average number of vacancies at the civilian hospitals--335--is more than three times the average occupancy of Hays. For many of the military personnel, retirees, and families affected, however, using those hospitals would require additional travel time, because five of the eight are located at least 45 minutes from Monterey.

Other Significant Effects. Closing Fort Ord will also have an impact on the Monterey-area real estate market during the next few years. Roughly 13,600 Fort Ord personnel and their dependents live in the local community. As a result of their departure, local realtors estimate that vacancies among rental units could reach 40 percent. The city of Marina, adjacent to Fort Ord, would be particularly affected. Officials estimate that up to 50 percent of Marina's rental housing is occupied by Fort Ord personnel and their families. An abundance of vacant apartments and single-family houses would depress rental fees and property values until new buyers and renters are found and a new equilibrium established.

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3. The figure is calculated using a DoD off-base spending factor for military income. DoD estimates that California military personnel spend about 73 percent of their income outside of their bases. According to the Department of Commerce, approximately 39 percent of such spending can be considered retail purchases. No off-base adjustment is necessary for civilians' income since they are not eligible to purchase retail items on-post. As with military spending, a 39 percent adjustment to civilian spending has been applied to estimate retail purchases.

4. A multiplier of 1.2 was used to calculate the total direct and indirect impact of the potential lost spending. That factor is based on the earnings-impact multiplier used by DoD for California.

5. The Presidio of Monterey, the Naval Postgraduate School, and Fort Hunter Liggett.

6. There are eight hospitals within an hour and a half of Fort Ord. Their total inpatient capacity is 1,092. Their total average occupancy rate for 1989 was about 68 percent.

In the meantime, reduced property-tax revenues will, in turn, have a negative effect on the quality and quantity of public services.

More vacancies will be created in the area if DoD decides to permit its personnel assigned to other local defense installations, but living in the community, to relocate into Fort Ord housing vacated after closure. According to recent estimates provided by the Naval Postgraduate School, the Presidio of Monterey, and the Coast Guard station, about 1,885 family housing units--some 30 percent of the available family housing units at Fort Ord--could accommodate military families currently residing in the community. A decision to open housing on the post to them would solve the current local housing shortage for military personnel and their families. (See further discussion of local housing beginning at the bottom of this page.)

Closing Fort Ord will also affect the area's school systems. Unless the base is resettled quickly, the four elementary schools and one middle school located on the post are likely to close. In addition, many students will be withdrawn from community public schools. Local sources have estimated that, as a result, the Monterey Peninsula Unified School District would lose about $22 million in federal and state funding. Neighboring school districts in Salinas, Pacific Grove, and Carmel could lose about $1.4 million in state and federal funds.[7] The loss of federal funding support will mean reductions in staff and programs, as the educational system adjusts to a new equilibrium with fewer staff and students.

Other effects will be felt in the transportation and utilities systems. Ridership on the Monterey-Salinas Transit system, according to local officials, may suffer a 20 percent reduction in local services.[8] A similar decrease in traffic in and out of the Monterey airport can be anticipated. Reduced consumption of public utilities may bring higher rates for remaining users.

Short-term negative effects, of course, may lead ultimately to some longer-term benefits. The community can anticipate more affordable housing as it adjusts to the loss of Fort Ord's buyers and renters. The downsizing of school, transportation, and utilities systems could lead to lower long-term infrastructure and support costs.

Long-Term Outlook for Monterey County

Despite the prospects for a troubling short-term economic impact, the potential certainly exists for a successful recovery. The history of past base closures is reassuring on this score. Former bases have been converted to a wide variety of uses: industrial parks, municipal airports, prisons, shopping centers, training facilities, local government offices, parks and recreation facilities, medical centers, and so forth. According to DoD's study of 100 such bases, the civilian jobs created in the process of conversion more than replaced those that were lost.[9]

Moreover, the Monterey area has natural attributes that should bolster its long-term recovery. The area's natural beauty and excellent recreational facilities have made it a major tourist attraction. In addition, it is located in a state that generates one of the nation's largest and most diverse economies.

Making use of Fort Ord's housing units could also help solve one of the area's important problems--lack of affordable housing. A dramatic increase in real-estate prices over

7. Community Task Force, "Initial Reports on the Defense Issues and Economic Impacts Associated With the Closure of Fort Ord, California," March 1990, pp. 45-46.

8. Ibid., p. 48.

9. Department of Defense, Office of Economic Adjustment, "Twenty-Five Years of Civilian Reuse: 1961-1986" (April-May 1986). This study did not address the issue of the economic impact of losing military jobs and, as a result, did not measure the overall economic recovery for the communities affected by base closures.

the past decade has meant that fewer lower- and medium-income families have been able to afford to rent or purchase homes. According to the Economic Development Corporation of Monterey County, the county's median income of $31,800 represents only 59 percent of the amount necessary to purchase a median-priced home ($156,817). Using the Fort Ord units might create downward pressure on local real estate prices, leading to more affordable housing for low- and medium-income families.

Although long-term prospects for recovery from the closure of Fort Ord seem likely, the amount of economic pain inflicted on the surrounding communities will depend heavily on how quickly Fort Ord's facilities can be revived for other uses. Problems of environmental cleanup pose both a threat to prompt reuse and an aid to general economic recovery.

Effects of Environmental Cleanup. The Environmental Protection Agency has designated Fort Ord as a Superfund site needing extensive cleanup: restoring the fresh water supply and three landfills located on the post; repairing or removing 209 underground fuel tanks; cleaning and restoring almost 10,000 acres of inland and beachfront training areas currently used for small arms and artillery practice; and cleaning three abandoned sewage treatment facilities.

This process could aid the local economy by attracting new business and creating a major source of new income for local firms. Fort Ord officials estimate that the cleanup needed before the base can be fully reused could cost between $56 million and $120 million; local officials have estimated the costs as high as $357 million.

Cleanup projects, however, could also retard local economic recovery if they delay the reuse. The impact depends on who will assume ownership of the base. If DoD simply transfers Fort Ord to another component within the department or to another federal agency, cleanup would not necessarily affect the timing of the reuse of base facilities; current law permits the transfer of government-owned property between federal agencies or within components of the federal government without requiring that environmental restoration be completed.

Cleanup projects could also retard local economic recovery.

If the post were transferred to a local government jurisdiction or private ownership, the situation would change. The Superfund Amendments and Reauthorization Act of 1986 requires that "all remedial action necessary to protect human health and the environment with respect to any such [hazardous] substance remaining on the property" be taken before the property can be transferred. Strict application of the law, or litigation arising from it, could bring a considerable delay before any of the fort's assets could be reused. According to estimates by the Environmental Protection Agency, it takes an average of about 10 years to complete cleanup of a Superfund site.

DoD would prefer to lease parcels of contaminated property or transfer parcels of uncontaminated property without having to wait until the cleanup of the entire base is completed. Such interim steps would minimize the impact of restoration activities on the local economy.

Closing Bath Iron Works in Southeastern Maine

Bath Iron Works (BIW) is a major shipbuilder located in a relatively isolated area of south

The USS Arleigh Burke, lead ship of the DDG-51 class of guided missile destroyers, built by Bath Iron Works. (Photo courtesy of Bath Iron Works.)

coastal Maine.[10] The company currently builds ships for the Navy and does not expect to close its operations. The following analysis, however, assumes that BIW does close in order to illustrate the potential impact that would have on the local economy--creating problems quite different from those associated with Fort Ord. Note that CBO does not propose or recommend the closure of Bath Iron Works nor any change in workload at the shipyard.

Status of BIW and Its Regional Importance

Bath Iron Works has built ships continuously for the Navy since 1890. Although the company has had considerable experience over the years in producing commercial ships, it estimates that Navy contracts constituted about 90 percent of total sales in 1989.

BIW's business is important to Maine. Contracts at the shipyard constitute about one-third of the defense spending in a state that ranks 12th highest in percentage of total output related to defense.[11] Consequently, any major changes to BIW programs would have a significant economic effect on the company and on the state's economy.

The Bath shipyard produces guided missile cruisers (CG-47 Ticonderoga class) and destroyers (DDG-51 Arleigh Burke class) for the Navy. According to current plans, the yard will deliver the last cruiser in June 1992. In the meantime, the company has begun building destroyers and plans to continue for the remainder of the decade.[12] Unless the company receives contracts for other ships, BIW's business, beginning in 1992, will depend almost entirely on the DDG-51 program.

The Navy awarded the contract for the lead ship of the DDG-51 class, the USS Arleigh Burke, to BIW in 1985. Since 1987, production contracts for DDG-51 have been shared between BIW and Ingalls Shipbuilding in Pascagoula, Mississippi. As of April 1991, the Navy had signed contracts for nine ships with BIW and for eight ships with Ingalls. Initial plans called for total procurement of five or six destroyers annually, enough to support production at both BIW and Ingalls. Since then, however, reduced international tensions have led to a planned reduction in the size of the Navy's fleet from 545 ships in 1990 to 448 ships in 1997. The Navy now envisions purchasing an average of only four destroyers each year, a workload unlikely to support both shipyards at even a lower level of activity.

In addition, there may be further cutbacks in the naval fleet to accommodate leaner defense budgets. CBO has estimated that, if the Navy faces a budget that is constant in real terms in the years beyond 1995, the fleet could decline to no more than about 310 ships

10. South coastal Maine consists of Cumberland, Sagadahoc, and York counties.

11. See Table 5 in L. Douglas Lee, "Economic Adjustments After the Cold War," testimony before the Joint Economic Committee, December 12, 1989. In 1989, defense spending accounted for about $2.7 billion of the state's total output of $38.3 billion.

12. The last DDG-51 currently under contract is scheduled for delivery in January 1996.

by the year 2010.[13] That might require the purchase of only one or two DDG-51 destroyers a year, which could limit production to a single shipyard and possibly lead to closure of Bath Iron Works.

That would not occur for a number of years. As of December 1991, the company's order backlog totaled about $1.5 billion--enough to ensure sufficient work through the middle of this decade. If closure comes, however, it would have major short- and long-term effects.

Short-Term Effects

BIW workers would probably suffer a substantial loss of income before they found new employment.[14] Based on 1989 salary figures, the region would lose approximately $300 million a year in shipyard payroll. Using 1989 state income figures, that would represent a reduction of about 1.5 percent in total personal income for the state and, based on 1988 figures, a loss of more than twice that magnitude in personal income for south coastal Maine. The disappearance of BIW's payroll would also have indirect effects on the economy, cutting into the personal incomes of those who provide goods and services to the shipyard and its workers. Using a conservative multiplier as a measure of the potential effect, total personal income in Maine could be reduced by almost 2 percent, and that of the south coastal region by as much as 4 percent.[15]

State and local unemployment rates would rise sharply after closure of BIW. Laying off the shipyard's 11,000 workers--about 5 percent of the employed labor force in south coastal Maine--would increase statewide unemployment (based on the 1989 rate) by about 1.7 percentage points. (In September 1991, the rate stood at 6.7 percent). Unemployment for the south coastal region would increase by 4.5 percentage points. If the indirect effects of losing 11,000 jobs are taken into account, state unemployment could increase by an additional 2.6 percentage points, and south-coastal unemployment by an additional 6.8 percentage points.[16]

State and local unemployment rates would rise sharply after closure of Bath Iron Works.

Anticipating reductions in its future business, BIW has already begun to cut its work force. In August 1990, the company announced plans to lay off between 2,000 and 3,000 workers over the next couple of years. If these layoffs occurred today, unemployment in the state would increase by about one-half of one percentage point. Regional unemployment would increase by about 1.3 percentage points.

For production workers, finding another job in Maine, or even in New England, would

13. Testimony of Robert F. Hale, Assistant Director, National Security Division, CBO, before the Subcommittee on Projection Forces and Regional Defense, Senate Committee on Armed Services, June 14, 1991.

14. To demonstrate the most serious impact conceivable, the following discussion--and the figures it cites--assumes that closure would occur over a short period of time. A more gradual timetable would reduce the short-term impact, but would ultimately have the same effect if the local economy remained constant.

15. The computation is based on an earnings multiplier of 1.2, which approximates the indirect impact of reductions in earnings of DoD civilian personnel. See President's Economic Adjustment Committee, Office of Economic Adjustment, *The Regional Economic Impact of Military Base Spending* (November 1980), p. 20.

16. The calculation is based on an employment multiplier of 1.5, the factor used by DoD's Office of Economic Adjustment to approximate the indirect effect of increases in unemployment due to defense cutbacks. Unemployment figures used in this section assume that workers remain unemployed.

probably prove difficult. Traditional nondurable manufacturing, long in decline in the region, is not likely to provide many opportunities to unemployed shipyard workers.[17] Moreover, employment in durable goods manufacturing in New England has been declining since 1984.[18]

Prospects would be no better for employment at other nearby defense installations. Pease Air Force Base in New Hampshire was recently closed, and Loring Air Force Base in northern Maine is scheduled to be shut down by September 1994. Cutbacks have occurred at Portsmouth Naval Shipyard in Kittery, Maine. Cutbacks in other New England defense programs and installations could also occur.

Workers able to find new employment would probably gain it at the expense of a smaller paycheck. The average BIW wage exceeds the state and south-coastal average by 31 and 26 percent respectively.

Long-Term Outlook

While the short-term prospects associated with closing Bath Iron Works would approximate those at Fort Ord, the long-term outlook for BIW and its area is worse. Should DDG-51 contracts no longer be available, BIW envisions few alternatives to expand its business during the remainder of the decade. Contracts for new Navy ships will henceforth be scarce, and, based on recent history, the chances of increasing the company's commercial business is also slight. Virtually no construction of commercial ships is taking place today in American shipyards, and BIW has not built a commercial ship for years.

Nor do current business trends provide much hope that the regional and state economies can generate new business to replace losses in the defense sector. New England's share of the manufacturing market for major durable goods has decreased steadily since 1984. Tourism, one of Maine's major industries, is not likely to expand by enough to replace BIW's contribution--and, in any case, tourism does not employ the same types of workers as does BIW.

Defense Cutbacks in St. Louis, Missouri

Defense cutbacks can also imperil the economic well-being of major metropolitan areas, as this case study of St. Louis illustrates. Although the analysis focuses on the area's largest defense contractor, the McDonnell Douglas Corporation (MDC), it also considers the effects of cutbacks on other defense contractors and installations in the area.[19]

Importance of Defense Spending to the St. Louis Economy

In 1989, approximately 73,500 employees--about 6 percent of employment in the St. Louis area--were employed by DoD or one of its contractors. Using a conservative estimate, those direct defense jobs produced, at least indirectly, an additional 85,300 jobs.[20] Including both types of employment, DoD spending in 1989 accounted for about 13 percent of the employment in the St. Louis area.

As of May 1991, MDC employed about 32,500 people, about 2.8 percent of the employment in the St. Louis area. Figuring indirect effects as well, almost 6 percent of St.

17. Edward Moscovitch, "The Downturn in the New England Economy: What Lies Behind It?" *New England Economic Review* (July-August 1990), p. 59.

18. Ibid.

19. Unless otherwise specified, discussion of McDonnell Douglas refers only to the company's facility in St. Louis.

20. This figure, used by the Missouri Division of Employment Security, assumes that one civilian defense job generates an additional 1.16 jobs.

A worker at a McDonnell Douglas production plant in St. Louis: The company accounts for nearly 3 percent of employment in the St. Louis area. (Photo courtesy of McDonnell Douglas Corporation.)

Louis employment depended upon defense contracts at MDC.

In 1989, wages and salaries tied directly to defense spending amounted to approximately $2.4 billion, about 8 percent of total regional wages and salaries.[21] In terms of indirect income, about $2 billion, 7.2 percent of regional wages and salaries, is tied to defense spending. Wages and salaries at MDC alone accounted for about 6 percent of those in the area. Including indirect effects, MDC's wages and salaries generated about 10 percent of the St. Louis total.

Defense Business at McDonnell Douglas

MDC benefited considerably from the major increases in defense spending that occurred in the 1980s. During the past decade, the St. Louis plant produced three aircraft models--the AV-8B for the Marine Corps, the F-15 for the Air Force, and the F/A-18 for the Navy--as well as the Navy's Harpoon missile. Until recently, MDC was a prime contractor for the Navy's new A-12 aircraft, and was competing to develop and produce the Advanced Tactical Fighter (ATF) for the Air Force. Those and other contract activities increased employment at MDC by almost 35 percent between 1980 and 1989. The growth in the company's labor force accounted for almost 7 percent of the new jobs created in the St. Louis area during that period.

But the past decade's growth trend has recently reversed, and MDC's business outlook has deteriorated considerably. Some of the deterioration stems from cutbacks in, or terminations of, ongoing military programs. The last deliveries of AV-8Bs, F-15s, and Harpoon missiles are scheduled to occur in 1993-1994, and the F/A-18 aircraft program has been cut back. The Congress authorized funds for 48 F/A-18s in 1991, fewer than were originally requested by DoD and 18 fewer than were funded in 1990.

More importantly, MDC has suffered delays in new programs and lost or failed to win contracts altogether. Production of the T-45 training aircraft has been delayed. In January 1991, the Secretary of Defense canceled a contract with MDC and General Dynamics Corporation to develop the A-12, a "stealth" attack aircraft, for the Navy. The company recently lost competitions to produce the ATF and the Army's Light Helicopter.

Not everything is bleak in MDC's business outlook. An increase in sales of the F/A-18 aircraft could aid the company's financial health. DoD plans to develop and produce an upgraded (E/F) version of the F/A-18, with production scheduled to begin in 1995 and likely to last well into the next decade. MDC is the contractor. The company is also planning to compete to develop and produce the AX aircraft, which will replace the Navy's A-12.

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21. The income percentage exceeds the employment percentage because defense wages exceed the average wage in the St. Louis region by a considerable amount, a situation that prevails nationwide. The Missouri Division of Employment Security determined that every dollar of defense wages and salaries generates an additional 86 cents in wages and salaries in the region.

Despite the potential for future business, it is reasonable to assume a substantial reduction in MDC's work force. For this study, CBO assumes a reduction of one-third in the MDC workforce between 1990 and 1995, and analyzes its potential effects on the St. Louis economy. Indeed, a substantial cutback has already occurred: from 40,500 in January 1990 to 32,500 in May 1991, a reduction of almost 20 percent in less than 18 months. The company payroll has decreased by about $229 million since January 1990. Although additional cuts are not likely during the next two years, since the company has a backlog of work, they could occur toward the middle of the decade.

Short-Term Impact of Defense Cuts on St. Louis

If MDC's workforce is reduced by one-third between 1990 and 1995, the company will be laying off approximately 13,400 workers. And if they were unable to find new jobs in the short term, the area's unemployment rate would increase by about 1 percentage point. Taking into account the indirect effect of that MDC action, an additional 15,500 jobs in the community could be lost.[22] Direct and indirect results of job losses at McDonnell Douglas could increase the unemployment rate by as much as 2.1 percentage points. (In October 1991, the unemployment rate in the St. Louis Labor Market Area was 6.8 percent.)

If wages and salaries at MDC were also reduced by one-third, total wages and salaries in the area would decrease by about 2 percent. Their indirect effects would decrease regional income by more than 3 percent.[23]

Much of that income loss would be suffered by MDC's major St. Louis subcontractors. In 1989, the company held 1,967 contracts--worth approximately $185 million--with local businesses. Many of them depend heavily upon MDC and would be seriously affected by cutbacks there. Indeed, unless they find new customers, firms totally dependent on MDC contracts might not be able to remain in business.

Many defense-dependent contractors in St. Louis tied to McDonnell Douglas might not be able to stay in business.

Defense spending may also be reduced for other defense contractors and installations in the area. If other-than-MDC defense employment were reduced by 4 percent annually, for example, approximately 7,400 defense jobs would be lost between 1990 and 1995. Taking their indirect effect into account, a total of 16,000 jobs could disappear. Together with the direct and indirect effects that would be associated with a one-third cut in MDC's payroll, unemployment in the area could increase by more than 3 percentage points. Total area income, including indirect effects, could decrease by more than 4 percentage points.

Those short-term estimates overstate the unemployment effects because they assume that no workers find other jobs. Recent employment data indicate that unemployment has not been as bad as the projections above would suggest. The majority of MDC job losses assumed in the example have already occurred, for example, but unemployment has increased only a few tenths of one percentage point since January 1990.

22. The multiplier used here (2.16) is provided by the Missouri Department of Labor and Industrial Relations.

23. The multiplier used here (1.86) is provided by the Missouri Department of Labor and Industrial Relations.

Many workers may be able to find new jobs in St. Louis, but probably at lower wages. MDC estimates that its average worker earned about $36,000 in 1990; by comparison, average income in the St. Louis area was estimated at about $25,000.

Retirement would cushion the blow at MDC. In 1990, approximately 2,000 of the company's employees--about 5 percent of the total--were eligible to retire with full benefits, and another 5,500 with partial benefits. Although MDC has thus far not tried to induce its eligible employees to retire, doing so could ease the impact of unemployment.

Long-Term Outlook

In the long term, St. Louis might regain some of the employment lost to defense cutbacks. MDC, for example, has the aircraft production prospects mentioned above. The company has announced its intention to transfer some of the production work on the C-17 from its plant in Long Beach, California, to St. Louis. And MDC intends to compete for a contract to build the AX aircraft.

On the other hand, further cutbacks in defense spending might well engender fierce competition among contractors. It is not clear how McDonnell Douglas or other defense-oriented firms in St. Louis would fare in this competition for increasingly scarce defense dollars.

As in other areas of the country, the long-term regional economic outlook will therefore depend in part on how successfully St. Louis defense firms are able to diversify into nondefense sectors of the economy. Part of that change, however, lies beyond corporate control because it hinges on the overall health of the economy. A robust economy is more likely to provide the opportunity for new markets.

The long-term employment outlook for the St. Louis area depends mostly on the outlook in the nondefense sectors. That outlook varies by type of occupation. For production workers, it is not particularly bright. The number of manufacturing jobs in the region declined steadily during the last decade. During the period 1979-1989, while regional employment grew by over 150,000 jobs, manufacturing lost almost 34,000. Recent events indicate a continuing trend. Chrysler closed a major assembly plant in May 1991, laying off approximately 2,000 production workers in St. Louis County. Other major employers--including Monsanto, Pittsburgh Plate Glass, Anheuser-Busch, and Lear Siegler--have also closed manufacturing plants during the past two years.

Yet employment opportunities in other sectors hold long-term promise. Recent projections for the area predict a significant increase in the number of jobs in the health service, computer, and management-support fields during the next decade. Many workers formerly employed in defense industries may possess the skills to qualify for positions in those fields. Of a sample of 400 workers recently laid off by MDC, about half have experience in data processing or in providing financial, clerical, or graphics support.

In sum, St. Louis--like Fort Ord and south coastal Maine--would suffer considerable short-term disruption in the wake of large-scale cutbacks in local defense activities. In the longer term, however, the diversity of jobs and industry inherent in a major metropolitan area gives at least St. Louis a brighter outlook.

Appendixes

Appendix A

Methods Used to Estimate Industrial and State Effects

The estimates of industrial and state effects of reducing defense spending were derived using the INFORUM model. Elements of the modeling system include: (1) the outlay estimator, (2) the defense translator, (3) the integrated macroeconomic-input-output model, (4) the detailed output model, and (5) the state model.

Outlay Estimates

The defense budget that the Congress debates and approves is expressed in terms of budget authority--that is, the authority to spend public funds. The first stage in the forecasting process is, therefore, to translate budget authority into estimates of outlays. That requires a timing adjustment to reflect the rate at which obligational authority is expended. These procedures are routinely applied by the Congressional Budget Office and the Office of Management and Budget, using data on historical expenditure patterns collected by the Department of Defense (DoD).

Total budget authority is divided among several major appropriation titles: military pay, operation and maintenance, procurement, research and development, and military construction. Within each category, several accounts appear; for example, "Operation and Maintenance, Air Force" and "Weapons Procurement, Navy." For each, DoD estimates the percentage of total appropriations spent in the budget year and subsequent years. Typically, money for military pay and operations is expended rapidly, with 95 percent or more of outlays spent in the year they are appropriated. Procurement budgets, in contrast, are spent over periods ranging from four to seven years.

In the current application, outlays, once estimated by the above process, were condensed to the 10 categories of spending shown in Box A-1. That was necessary to take the second step in the forecasting process--the

Box A-1.
Expenditure Categories Used in the Defense Translator

Military Personnel

Operations and Maintenance Expenditures

Aircraft Procurement

Missile Procurement

Weapons and Tracked Combat Vehicles Procurement

Shipbuilding and Conversions

Ammunition Procurement

Other Procurement

Research, Development, Test, and Evaluation Expenditures

Military Construction and Other Expenditures

SOURCE: Department of Defense, Office of Industrial Base Assessment, "Defense Purchases: An Introduction to DEIMS," p. 8.

translation of spending by budget account into estimates of direct defense purchases from industry.

Estimates of Defense Final Demand Using the Defense Translator

For each year of the simulation, the outlay vector is converted into estimated defense direct demand by industry, by assuming a linear relationship between the amount of outlays in each budget category and the final demand for each of the input-output industries supplying DoD with items bought with the outlays. The relationship is expressed mathematically by:

$$d_t = B_t z_t$$

where

- d_t is the vector of final defense demands by industry in period **t**;
- B_t is the defense translation matrix for period **t**; and
- z_t is the vector of outlays by budget account in period **t**.

The translation matrix B_t has as many rows as there are industries (for example, 420 in the INFORUM model implementation) and as many columns as there are DoD budget categories (10 in the INFORUM model). The element b_{ijt} is the proportion of budget account **j** that is directly purchased from industry **i** in period **t**; each column of B_t totals one. (Military and civilian personnel pay is assigned to the government sector, an "industry" in the input-output scheme.) Coefficients vary over the simulation period to reflect changes in the mix of products funded in the defense budget. The defense translator is described in more detail in Appendix B.

Macroeconomic and Industrial Output Simulation

The model combines the assumed level of defense expenditures with chosen assumptions for other macroeconomic variables to generate projections for other final demand components of the GNP, as well as for output and employment by industry. The simulation results were generated using an integrated model. That model--as exemplified by the INFORUM LIFT model used for these calculations--estimates gross national product and income as the sum of industry output and factor income, rather than as the sum of macroeconomic aggregates. Because of its detail, LIFT makes only annual forecasts. It is not primarily designed to predict quarterly fluctuations in the economy.

The components of final demand (consumption, fixed investment, inventory investment, exports and imports) are estimated by regression methods for each of 78 major industrial sectors. Interindustry demands for each industrial sector depend on these predictions of final demand and on values of interindustry coefficients that vary over time. Relative wage and labor productivity are also forecast for each of the 78 industrial sectors, so that predictions of employment and income can be calculated based on the output figures.[1]

1. For more details about the INFORUM model, see "The INFORUM Long-term Forecasting Tool and Detailed Output Model" (Interindustry Forecasting Project, University of Maryland, College Park, Md., 1990). For a discussion of the merits of the two forecasting approaches, see Clopper Almon, "The Industrial Impacts of Macroeconomic Policies in the INFORUM Model" (Department of Economics, University of Maryland, College Park, Md., 1986).

Detailed Projections of Output by Industry

The 78 industrial sector projections are converted to predictions for 420 industries using the INFORUM Detailed Output Model (DOM). DOM is a traditional input-output model, in that it first derives forecasts for final demand categories by industry and then solves for output by industry. DOM relies heavily on the INFORUM LIFT model (macroeconomic interindustry model), converting LIFT's 78-sector forecasts of final demand by product to estimates for some 420 producing sectors. Unlike LIFT, DOM does not forecast value added, prices, or macroeconomic variables. The final demand categories forecast by DOM are (1) personal consumption expenditures (PCE); (2) producers' durable equipment (PDE) investment; (3) construction investment; (4) imports; (5) exports; (6) federal defense expenditures; (7) federal nondefense expenditures; (8) state and local government educational expenditures; and (9) other state and local government expenditures.

The DOM model forecast is calculated in 1977 dollars; the model simulation must start in 1977, and it can be run out to the year 2010. Each DOM forecast must rely on a corresponding LIFT forecast, since DOM uses most of the LIFT final demand forecasts as controls. However, DOM has its own versions of the four matrixes involved: direct requirements, the construction bridge, the investment to PDE bridge, and the PCE by industry bridge. DOM also has its own econometric equations for exports, imports, and inventory change, although they must total the corresponding LIFT aggregates. Fixes, or modifiers, may be applied at the detailed industry level, even when the variable has been calculated by apportioning the LIFT industry group forecast among its component industries.

State Estimates of Total Gross Output

INFORUM's methods for estimating the impact of defense spending on individual states is patterned on the actual distribution of defense dollars. Purchases from industry are allocated to individual states using data on the distribution of prime contract awards among the states. Spending on military and civilian payrolls is distributed based on administrative records of the location of the personnel. The sum of those constitutes direct defense purchases, the concept for the data described above.

When projecting defense cuts, however, the indirect economic activity derived from direct defense spending must also be taken into account. It includes the purchases of parts and components for defense goods, which often are produced in states other than those most involved in direct defense production, and legal, transportation, and other services used by the defense industry. The indirect production is first estimated at the national level for each supplier industry; the national totals are then distributed to the states based on the importance of that industry in each state.

Appendix B

The Defense Translator

The key element of the forecasting system used to analyze defense spending reductions is the defense translator. It originated in the bridge table for federal purchases that was developed in the 1950s, as part of the system of input-output accounts, by the Commerce Department's Bureau of Economic Analysis. That table used fixed coefficients and did not distinguish between defense and nondefense purchases by the federal government.

In 1980, Department of Defense analysts saw the need for a better tool to analyze the economic effects of defense spending, and DoD's Office of Program Analysis and Evaluation began a research effort to develop an improved translator. Special tabulations were performed by DoD, the Office of Management and Budget, and the Commerce Department to permit the detailed categorization of DoD purchases by product. By 1982, a working version of the defense translator was available.

Since the translator was established, DoD has continued to refine it, and procurement categories have became much more detailed.[1] For instance, instead of using one distribution vector for all aircraft that DoD buys, the translator now includes 25 vectors for individual aircraft models. Similarly detailed vectors exist for missiles, weapons, artillery rounds, and ships. Other categories of spending for such minor items as trucks and furnishings are categorized according to tabulations of administrative records, including data on prime contract awards. The data identify individual products and services and relate them to the appropriate Standard Industrial Classification Code.

In all, the 1989 version of the translator uses some 209 vectors to identify defense final demands. The publicly available translator matrix used in this study is produced by aggregating these detailed predictions to 10 major defense budget categories (see Box A-1 on page 45). Those are then converted into share vectors, reflecting the share of total DoD spending in each category allocated to the product classes. Aggregation is done separately for every year in the multiyear defense plan, so that changes in shares in time reflect changes in the composition of the budget.

1. This description is extracted from Thomas P. Frazier, Carol G. Campbell, and Richard T. Cheslow, *The Revised Defense Translator* (Alexandria, Va.: Institute for Defense Analyses, 1989).

Appendix C

Significance to Industries of the Composition of Defense Spending

The estimates of the impact of defense spending reductions on individual industries presented in Chapter 3 assume that the major categories of defense spending--investment (including procurement spending) and operating costs--are reduced in the same proportion. As discussed in the Introduction, the assumption mirrors that of the Administration's budget plan for fiscal years 1993 through 1995. The budgets for 1991 and 1992, however, cut spending for procurement by a much larger percentage than spending for operation and support. To test the sensitivity of the economic results to changes in the composition of the cuts, an experiment was performed that varied these proportions.

In order to help isolate any effects of changes in composition, defense spending was assumed to be reduced more dramatically in this experiment than under the Administration's 1991 plan. Defense budget authority was subjected to a 10 percent annual reduction in real terms, leading to a cumulative reduction of 41 percent by 1995 compared with 18 percent under the 1991 plan. Two simulations using the same total reduction were performed. The first cut all appropriation accounts at the same rate. The second reduced the investment appropriations (procurement, research and development, and military construction) by 12 percent a year, for a cumulative reduction of 47 percent by 1995; operating and support funding declined at 8.5 percent a year (a cumulative total of 36 percent) over the same period.

Pursuing investment-heavy cuts does not alter the basic pattern of results, although the magnitude of the effects is somewhat greater. By 1995, assuming across-the-board cuts, declines in total sales for the 13 industries that suffer the greatest relative impact range from 2 percent to 34 percent. If the cuts are disproportionate in the investment categories of defense spending, the same 13 industries suffer sales reductions ranging from 3 percent to 39 percent (see Table C-1).

Thus the impact on an industry of a reduction in defense spending relates primarily to the share of its sales that comes from defense. Changes in the mix of defense spending between operations and investment appear to have less impact on these results.

Table C-1.
Industrial Impact of Reducing Defense Spending by 10 Percent a Year

Industry	Estimated Output in 1995[a] (In billions of dollars)	Percentage Change from Base Case	
		Across-the-Board Reduction	Investment-Heavy Reduction
More than 75 Percent Defense-Related[b]			
Tanks and Tank Components	2.5	-33	-39
Guided Missiles	19.8	-34	-38
Shipbuilding and Repair	12.1	-30	-31
40 Percent to 75 Percent Defense-Related			
Explosives	2.3	-14	-16
Other Ordnance	2.4	-13	-14
Communication Equipment	68.2	-12	-14
Aircraft, Missile Engines	31.6	-10	-11
Aircraft	65.4	-10	-11
Large-Caliber Ammunition	9.6	-7	-8
5 Percent to 40 Percent Defense-Related			
Small Arms Ammunition	2.0	-4	-5
Aircraft, Missile Equipment	40.3	-3	-4
Engineering and Scientific Instruments	8.5	-2	-3
Nonferrous Forgings	2.2	-2	-3

SOURCE: Congressional Budget Office using the INFORUM Model.

NOTES: Investment-heavy reduction = cuts of 12 percent per year in investment appropriations.

a. Estimated for the base case.

b. Defense shares measured in 1990.

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